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An evolutionary perspective on children's learning.

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AN EVOLUTIONARY PERSPECTIVE ON CHILDREN'S LEARNING

A Dissertation Presented

By

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DEDICATION

To Kalman,
who started me on this road and helped me think it through.
To JoAnn,
who not only helped me think it through but lived with it every day for more than four years.
And to Caitlin,
who has more patience than anyone has a right to expect of a kid.

It's great to be back with the band!

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Finally, I would like to express my appreciation to the staff and students of Work Experience Classroom -- an alternative school where I worked from 1975 to 1979 -- for making it possible for me to have an experience that made me believe in education and confirmed my faith in human beings.

ABSTRACT

AN EVOLUTIONARY PERSPECTIVE ON CHILDREN'S LEARNING

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This study is an investigation of learning and human evolution and examines material in the areas of evolutionary biology, primate studies, archaeological evidence for hominids and early humans, and ethnographic data on nomadic foraging societies.

Three socio-emotional systems common to all social primates are identified, and it is proposed that these systems have been crucial to children's learning in the course of human evolution. It is further proposed that because they are biologically based these emotional systems still exert pressure on children's learning today.

The ways in which the young of non-human primates become competent group members and the ways in which the social structure of the group forms the context of that learning are examined. The probable social environment for learning in early human societies is described, and the ways in which children in contemporary nomadic foraging societies learn to become competent group members are identified. The connections between what the young need to know, the activities of learning, and social relations are examined.

The perspective derived is then applied to schooling in the United States, and it is proposed that schools are often antagonistic to the characteristics of learning common to the human species. Principles useful in the evaluation and planning of educational programs are offered, and some directions in education that seem promising in the context of the evolutionary paradigm are briefly discussed.

TABLE OF CONTENTS

CHAPTER I

INTRODUCTION

> "Let it be borne in mind how infinitely complex and close-fitting are the mutual relations of all organic beings to each other and to their physical conditions of life."
>
> --Charles Darwin
> Origin of Species

In 1977 when I was the director of an alternative school in Fitchburg, Massachusetts, I attended a series of open hearings of the North Middlesex Regional School Committee in Townsend, Mass. concerning a Humanistic Education program that had been introduced in the elementary schools of the district. In the course of three meetings I learned that this program consisted of what were called "values clarification exercises" in which children were urged to explore their deeper thoughts and feelings. On the first night a man stood, identified himself as the father of two children in elementary school and began to read pronouncements on education from the conservative Heritage Society. Then, his face red with emotion, he clenched his fists and shouted, "Give us back our children!" Humanistic Education, the man claimed, was undermining the authority of the home and the rights of parents to rear their own children. It seemed that the man spoke for many in the audience who did not necessarily share his extreme political views but agreed that the primary function of the school is to provide children with basic skills and basic information -- and certifications of achievement--

not to probe children's feelings or attempt to influence their attitudes.

The other side at these hearings was represented by liberal parents and teachers who insisted that the schools were already committed to doing much more than providing basic skills instruction. During the second meeting, a week later, a teacher from one of the elementary schools in the district took the microphone and said that because children spend so much of their day in school it is foolish to think that all they do there is learn how to read, write and do math. She maintained that attitudes, beliefs and prejudices were being formed and transmitted in school -- whether parents like it or not -- and that by and large the schools were doing a poor job of helping children sort through confusing, and sometimes contradictory, pressures.

It seemed to me at the time that compromise for these two sides was impossible because their disagreement over the purposes of formal education was one of kind. While both groups accused the schools of failing with children, their frameworks for the interpretation of success and failure were so divergent that one group's description of what children need served only to make the other group angry.

This split between what are usually called "conservatives" and "liberals" is, of course, not new, nor is their fundamental agreement about the poor performance of the public schools. In 1938 John Dewey wrote:

> Conservatives as well as radicals in education are profoundly discontented with the present educational

> situation taken as a whole. There is at least this much agreement among intelligent persons of both schools of educational thought (p. 89).

To judge from the North Middlesex School Committee hearings I attended the situation has changed little since Dewey's time. The only agreement remains the perception that education isn't working, and the disagreements are so profound and emotional that there is no movement toward a broader understanding of the crucial questions surrounding education and children's learning: What should be taught in the schools? In what way should it be taught? What relationship do (should) the schools bear to other social institutions and to communities? What, after all, is the purpose of schooling in a modern, industrialized nation like the United States?

Every year new studies emerge* indicting the schools, the teachers, the entire structure of formal education and/or the culture that is represented by such a structure, but the premises upon which these studies are based usually exclude one another with the result that frameworks of educational thought and interpretation rise parallel to one another -- like columns in a termite mound -- but never come together to form an arch. What is needed are new ways of viewing children's learning and formal education that enable us to either join some of these columns at the top or create a wholly new foundation upon which we can begin to build fresh ideas.

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*This has been a particularly prolific year for reports on education with the appearance of A Nation at Risk, the report of the National Commission on Excellence in Education; the Carnegie report on American high schools; and the Goodlad report.

This dissertation is an attempt to describe a new paradigm within which the formal education of children may be considered. It is grounded in an investigation of human evolution, and its primary premise is that a clearer understanding of the ways in which human beings learn as a species can provide a more fundamental starting point in our attempts to determine what the schools should or should not be doing and what education should be.

The attempt to better understand contemporary human needs and behavior through an examination of human evolution is not new, nor has this area of study been free of controversy and polarization. Certainly the "nature/nurture" debate, already old by Darwin's time, was intensified by the development of a theory of evolution, and this debate persists today. However, in the last twenty-five years so much knowledge has been acquired in the areas of evolutionary biology, animal behavior (especially primate studies), hominid and early human archaeology, and the lifestyles and social structures of nomadic foraging societies that it now seems clear that the nature/nurture debate is greatly oversimplified. It is pointless to ask <u>whether</u> human behavior originates in nature or is developed in a child's nurture. It is only somewhat less pointless to ask <u>how much</u> of either is responsible for the behavior of human beings. The questions being asked today by those who attempt to apply an evolutionary perspective to an understanding of our contemporary world revolve around the ways in which the patterns and structures developed in the human evolutionary past <u>interact</u> with the environments in which

humans grow and learn today. These are difficult and complex questions, but questions of such significance should be difficult and complex.

In recent years many have become engaged in the study of how the human evolutionary past may inform the human present. Some of these investigators have been biologists (e.g. Wilson, 1975, 1978; Waddington, 1960), some have been primatologists (e.g. Lancaster, 1975; van Lawick-Goodall, 1971), and some have been ethologists (e.g. Lorenz, 1971; Eibesfeldt, 1975). Though the interpretations made by these students of human evolution vary considerably at times, all share a fundamental premise that human beings as products of the processes of evolution are related to other forms of life on earth and have characteristics of physiology and behavior that reflect this heritage.

In the realm of children's learning, studies uniting an evolutionary perspective and cognitive development have been made by Piaget (1971, 1976, 1980) and Fishbein (1979), and an attempt to define a relationship between education, community and human evolution has been made by Oliver (1976). The study that follows focuses on the relationships between sociality, emotion, and children's learning in human evolution and owes a great debt to the perspectives developed by Piaget, Fishbein and others mentioned above. However, in its emphasis on the links between the emotional systems associated with social living and those associated with children's learning it is unique and in fact provides a critical perspective from which

previous studies of learning and human evolution may be examined. This dissertation will explore the following four ideas about evolution, emotion, sociality and learning:

a. In the course of hominid evolution, humans expanded upon and developed unique contexts for certain emotions of sociality that are part of life in all primate groups and are reflected in primate social relations and organization. These expectations, needs, responses and reactions are still very much a part of what it is to be human.

b. The purposes of human learning, from an evolutionary perspective, are exactly the same as the purposes of learning for other social primates: (1) to enable the young to survive in the physical environment and (2) to help the young become competent members of a social group.

c. The activities of children's learning and the emotions of sociality evolved in a feedback relationship to each other. An oversimplified example would be that a child's need to belong to a social group is fulfilled by participating as a full member of a social group, which in turn reinforces the need to belong.

d. If there are species-wide biological constraints involved in the way children learn in modern industrial societies, they will be more easily observed and understood in terms of these emotions of sociality than in terms of cognitive activity such as classification, conservation, memory or intelligence.

As intimated above, the fundamental components of the study of human evolution are (1) evolutionary biology, (2) primate studies, especially studies of the great apes and old world monkeys, (3) archaeological evidence of hominids and early humans, and (4) ethnographic data on nomadic foraging societies.* In this study literature

*This area of investigation presents particular problems which will be discussed below.

from these areas is reviewed and an attempt is made to draw some conclusions about how children learn as members of the human species and how this learning heritage may be affected by modern schooling. But before proceeding there are some problems and controversies associated with an evolutionary perspective that must be addressed here.

Problems in the Study of Human Evolution

An evolutionary perspective is a perspective on everything related to human beings. It is a way of seeing not only children's learning but human interaction, history, psychology, the relationship of humans to the natural environment, the effects of technology, etc. Assumptions about human nature abound in every aspect of human social life and thought, and attempts to define the "nature of children's learning" may strike all these chords simultaneously. Indeed, any perception about the way children learn as members of the human species threatens at every moment to expand into a perception about Western society in general, or child-rearing practices in modern industrial societies, or male-female relations. Gigantic, unwieldy hypotheses thrust themselves forward for consideration, and once entertained they tend to force even larger, more generalized hypotheses. If an evolutionary perspective on children's learning represents a "paradigm shift" (Kuhn, 1970) in education -- in that the framework this perspective affords is substantially different from

previous investigative frameworks in education -- it is important to note that this same paradigm can be applied to every other aspect of human life. Needless to say, wherever a controversy is struck sparks will fly.

Human behavior and evolution. All evolutionary processes take place in the context of what Waddington (1957) called the "epigenetic system," which consists of the genotype (the genetic structure of the individual and of the gene pool within the basic reproducing group or "deme"), the phenotype (observable characteristics of the individual) and the environment in which the organism lives. The genotype includes a wide range of potentialities that are not necessarily realized in the phenotype, the phenotype includes not only physical attributes but developmental and behavioral characteristics too, and the environment for animals that live in groups is social as well as physical.

Evolution is, in its most basic terms, the interaction of these three elements in a stochastic* process; that is, a process that consists of both random events and regulatory mechanisms which select certain events rather than others. If a mutation in the genotype is realized in the phenotype, the organism must survive in the environment with its new characteristic. Darwinian fitness means that if

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*"If a sequence of events combines a random component with a selective process so that only certain outcomes of the random are allowed to endure, that sequence is said to be stochastic." (Bateson, 1979: 230)

a variation in the genome is negative the organism will either die, or not reproduce, or produce fewer offspring than individuals without the new characteristic. But if the variation is positive the organism will be more fit, that is, will reproduce more successfully, and will thus perpetuate the mutation in the gene pool of the species. Mutations are random events (or if mutation is ordered we are unaware of how it is ordered), and the characteristics of the environment act as regulatory mechanisms that eliminate negative or unfavorable alternatives that are realized in the phenotype.

In this oversimplified description adaptation may be viewed as the spread and stabilization of characteristics through a population in a particular environment. A successful adaptation leads to a kind of homeostasis within the deme in a given environment which will hold until either the environment changes or some more successful variation in the genotype occurs and is reflected in the phenotype.

A fundamental problem of evolutionary theory since Lamarck has to do with the relationship between the behavior of the phenotype and the structure of the genome. This question is at the core of our understanding of adaptation, is crucial to a study of how the human evolutionary past may be related to modern life, and is two-sided. On one hand is the question of whether or not the behavior of individuals has an effect on genetic structure, and on the other is the question of how the genotype affects the behavior of individuals.

Fifty years before Darwin published Origin of Species (1859) Lamarck wrote Philosophie Zoologique (1809) in which he postulated

direct connections between the behavior of individuals, what he called the "inheritance structure" of the species, and the environment in which the individual organism lived. Although Lamarck was mostly ignored in his own time the "inheritance of acquired characteristics" was incorporated into Darwin's later work and has continued to exert a certain attraction even today -- perhaps because, as Bateson says "...the biological world looks like a product of Lamarckian evolution" (1979: 160). For Lamarck the demands of the environment forced all living things to use some characteristics more than others (the famous example is the giraffe which stretches its neck further and further to reach leaves higher in a tree as the lower leaves are eaten). These exercised characteristics could then be inherited, in their developed form, by the offspring.

The neo-darwinists of the first half of this century (see Dobzhansky, 1955) demonstrated that there was no evidence for such a connection between the use or disuse of characteristics by parents and the inheritance of these characteristics by their offspring. According to these evolutionary biologists there was no observable communication "backwards" from the phenotype to the genotype.

But the relationships between genotype, phenotype and environment are extremely subtle and complex, and in the 1950's Waddington showed in his famous experiments with the fruit fly Drosophila that characteristics which appeared in individuals as the result of environmental change could become incorporated into the genetic structure of succeeding generations. This was a kind of "internal selection

process" which Waddington called canalization. In one experiment Waddington subjected flies with a crossvein wing pattern to heat stress at an early stage of development. Most of the surviving flies developed wings without crossveins after the stress; however, 99% of their offspring developed normal wing patterns when not subjected to the heat stress themselves. But if these offspring were subjected to the same stress they too developed abnormal wings without crossveins. Over a number of generations in which each generation was exposed to the heat stress at an early stage of development, the characteristic of wings without crossveins became assimilated into the genetic structure of the flies so that eventually the offspring of unstressed flies developed the abnormal wing pattern (as did their offspring). The new characteristic had become incorporated into the organism's genotypic structure, or canalized.

This was not Lamarckian inheritance. The heat stress had not produced abnormal offspring immediately (indeed, there had been great resistence in the genome), nor had it produced a new genetic characteristic. Rather the stress had released a potential that had been in the genome all along but had been suppressed in the normal phenotype.

In The Strategy of the Genes (1957) Waddington offers a metaphor to illustrate canalization with regard to epigenesis (the development of the embryo), a metaphor which has served to elucidate later discussions of the relationship between phenotypic behavior, the environment, and genetic structure by Piaget (1976), Fishbein (1979), and Wilson (1978). Waddington describes a ball rolling through a landscape

etched in a series of channels of varying depth.

> Has the valley a flat bottom and gently sloping sides? If so, there will be only rather a slight tendency for a developmental trajectory, when displaced from the valley centre, to find its way back there again; the final adult character will be easily caused to vary by minor fluctuations in the conditions under which development occurs. On the other hand, if the valley bottom is very narrow and the sides steep, it will be more difficult to push the trajectory away from its normal course and it will quickly return there, unless indeed it has been pushed over the crown of a watershed wither into another valley or on to a plateau which represents some aberrant condition intermediate between one organ and another (1957: 30-31).

To apply Waddington's metaphor to his experiments with Drosophila, the heat stress the flies were subjected to during epigenesis nudged the developing phenotype out of a valley that normally would have led to wings with crossveins and into another, shallower, valley for the development of wings without crossveins. Repeated environmental stress deepened the channel for wings without crossveins to the extent that after a number of generations it became the normal developmental channel for that population of flies.

In his investigations of cognitive development in children Piaget postulated that the child was an "active organism" (e.g. 1952) with innate tendencies towards <u>organization</u> and <u>adaptation</u> through which it seeks to achieve equilibrium in its environment. In the context of this interchange with the environment the child forms strategies which it tries out in an effort to achieve this equilibrium. As these strategies meet with more or less success, and as the child

matures, the child refines and stabilizes its internal structures so that eventually a dynamic balance between the two elements of adaptation (accomodation and assimilation -- see Chapter 4) is reached. Thus cognitive development for Piaget was a complex interaction of physiological maturation and these equilibration processes.

Waddington's experiments showed that profound stress in the environment can cause, over time, the incorporation of "new" characteristics into the genetic structure of an organism. But in his assumption that an organism seeks experience in the environment, Piaget added a new dimension to the epigenetic system. This motivation to interact with the environment was conceived by Piaget as genetically based, and in his later work (1971, 1976, 1980) he attempted to describe a correspondence between the cognitive development of individual children and the development of human intelligence in the course of evolution. According to Piaget both are processes in which equilibrium is achieved and disrupted, achieved and disrupted in complex interactions of genetic messages, phenotypic behavior and environmental fluctuation which lead to increasingly complex organization. Piaget maintains that the intricacy of the balances between the three elements of the epigenetic system that are observable throughout nature generally and in human cognitive development specifically demands a model of evolution that includes some communication between the activity of the phenotype and the internal environment of the genome. In other words Piaget believed that through the development of a phenocopy the behavior of indivi-

dual organisms could be reflected in some way in that organism's genetic structure.

> Of course, new accomodations, and forms of behavior brought about by environmental changes will change the internal environment to a variable degree. In some cases the modification may be superficial, in which even the production of accomodats [Piaget's term for phenotypical or "somatic" variations] will not necessarily be followed by genic transformation. Elsewhere, adaptation to a new external environment, along with new types of behavior, can give rise to more or less profound imbalances capable of changing the internal environment at more primitive hierarchical levels. And it is the new mutations made possible by such circumstances (whether or not they are related to the imbalance...) which become subject to selection by the internal environment, and hence to a sort of endo-adaptation (Piaget, 1976: 21).

Until very recently Piaget's conception of a more or less direct biochemical relationship between the behavior of the phenotype and the environment in which genetic selection takes place would have been considered speculative in the extreme. Yet in recent years the work of Barbara McClintock, who predicted the existence of so-called "movable genetic elements" thirty years ago, has been substantiated. The genome is indeed rather unstable. "Jumping genes" (Lewin, 1981) have been identified, bits of DNA in varying sizes that migrate from one part of the chromosome to another, and if the relationship between the external experience of the phenotype and the internal environment of the genotype is not yet known, it is now conceivable that some relationship like that described by Piaget might exist. Yet even the phenocopy is not Lamarkian, for the incorporation of phenotypic

experience into genetic structure is neither automatic nor linear. There is no one-to-one relationship between behavior and the effect it has upon the environment of the genome. Nevertheless, Piaget believed phenotypic behavior to be so important to the processes of evolution that he called it the "motor of evolution" (1976).

What does this complex of relationships between genetic structure, individual behavior, and the external environment mean for children's learning? To begin with, learning is a process that is common to all animals (and Piaget argues that plants learn as well). Like reproduction learning is essential for the survival of the species, and each species has evolved physiological and behavioral characteristics associated with learning. If Piaget is right we should expect a tremendously complex interrelationship between the behavior of organisms, the environment in which they live and their genetic structure; but even if Piaget is wrong and there is virtually no communication between phenotypic activity and genic selection, we should be able to identify characteristics of learning particular to each species which have been incorporated into the genetic structure of that species through the processes of canalization and adaptation. Thus human beings, as products of these same processes, should have certain characteristics of learning in common, and, indeed, Piaget, Bateson, and others insist that the processes of learning in humans are what they are <u>because</u> they evolved.

But the complexity of these relationships also urges caution in the assignment of behavioral characteristics of learning in modern

humans to genetic roots -- and particularly in the definition of these roots -- for, as Piaget points out, the behavior of the phenotype (in this case the learning child) is not determined by the genetic structure of that individual but emerges in a complex of interactions that involve all three elements of the epigenetic system at any given moment. Indeed, the so-called "sociobiology debate" (Caplan, 1975) which pits those who insist on a formidable genetic component to modern human behavior against those who worry about how a genetic theory of behavior might be misused socially is a kind of red herring in this question for it urges the old nature/nurture dichotomy.

When one uses the term "selfish genes" (Dawkins, 1976), it is impossible to avoid connotations of genetic determinism that no disclaimers can dispell, and an extremely complex process is oversimplified. On the other hand, if human beings have emerged from the same processes that shaped the duck's webbed foot or, for that matter, the panda's thumb (Gould, 1980) there is no doubt that our behavior in any environment has components that are biologically based. It is as foolish to claim that the evolutionary heritage of humanity exerts no significant pressure upon modern human behavior as it is to claim that modern human behavior is determined by genetic structures.

In this study learning is considered to be a complex of activities that reflect both genetically based motivations common to the entire species and the demands of the environment in which individuals exist. Human beings are cultural beings, and this means that the environment in which the young grow and develop is profoundly affected by the

language, social organization, ideas, customs, and history of those with whom the young live and come in contact with. But the impact of the cultural environment on the learning of the young does not cancel out biologically-based characteristics of learning, it only greatly complicates the context in which these human learning characteristics are located. Indeed, for many the physical evolution of the human being and the evolution of the human being's culture are processes which were once inextricable (see Chapter 3). This dissertation is a search for biologically-based components of human learning in chapters 2 and 3 and an attempt to apply the insights derived from this investigation to the plight of modern schooling in chapters 4 and 5. But even when the fact of the human connection with the processes of evolution and with other life on earth is accepted, more specific problems in the development of an evolutionary perspective remain.

Primate studies. One difficulty encountered when looking for relationships between humans and other primates is the question of which "correspondences" apply to the relationship and which do not. There are a number of catarrhine (old world monkeys, apes, and humans) species that have characteristics which seem to be connected in one way or another with human characteristics, and it is tempting to pick and choose among them in the creation of hypotheses. These similarities look like familiar landmarks in the often bewildering complexity of evolutionary relatedness, but it is difficult to tell

whether such "correspondences" are actually homologous (that is, the resemblance is evidence of evolutionary relatedness) or analogous (the resemblance is fortuitous and arose independently -- perhaps in response to similar environmental pressures).

Gibbons, for example, form monogamous "family" groups (Ellefson, 1968) of a male, a female, and their young offspring, and one is drawn to compare the social life of gibbons to the family structures of human beings. No doubt the comparison is all the more compelling because monogamous male-female dyads are prevalent in many human societies, and often these dyads are idealized. Nevertheless, though the gibbon pair-bonding bears this superficial similarity to human pair-bonding, it is only analogous according to most primatologists. "The gibbon 'family' is a common pattern for small birds and mammals in the tropics and does not represent a predecessor to the human family" (Lancaster, 1975: 34).

The hamadryas baboon's social organization is based on the "harem," that is, a group of females guarded by a single dominant male (Kummer, 1971). The baboon is of great interest to those engaged in the study of human evolution because most species are ground-dwelling, as were ancient hominids, and some researchers have found in baboon social arrangements models for human social life.

> Man's latent or overt inclinations for dominance hierarchies, closed groups, and discrimination against outsiders suggest that he approached the baboon type of society, at least at one stage of his evolution. In many respects the hamadryas baboon's society of closed but coordinated family units is a better model of human social structure that that of the chimps (Kummer,1971:152).

But as with gibbon social arrangements and human family life, any correspondences between the hamadryas "harem" structure and human "dominance hierarchies" must be examined with great care. Many believe that the hamadryas harem is "not so much a unit adapted for mating as it is for foraging in an environment of scarce and scattered food resources" (Lancaster, 1975: 33).

In the end it seems that the best approach to the study of other primates for the light that can be shed on human learning is not to match characteristics (either physiological or behavioral) one for one but to describe the kinds of relationships, behaviors and activities that occur relevant to learning in other catarrhine societies.

Although there is considerable variety between primate species in terms of the size of subsistence and breeding groups, the range such groups cover in their search for food, and the permeability between groups of the same species, it is possible to view societies of old world monkeys and apes in terms of "axes of social organization" which provide a general and flexible framework within which major themes of primate sociality, and thus primate learning, may be identified. Lancaster describes five such axes (1975): (1) dominance and dominance hierarchies, (2) the mother-infant bond and the matrifocal sub-unit, (3) the sexual bond between males and females, (4) the separation of roles by sex, and (5) the separation of roles by age.

> They are like themes which are woven together to form a pattern unique for each species. Sometimes certain of these axes will be emphasized in meeting the challenge of a particular environmental problem confronting the species or perhaps only the social group. Sometimes,

> too, a particular social group may have a social tradition in which one of these themes may dominate whereas its neighbors will have another (Lancaster, 1975: 13).

With some modification this approach is used in the study that follows, and an attempt has been made to demonstrate the connections between primate social behavior and organization, and the contexts, purposes and activities of primate learning.

For young social primates of all species, including humans, learning means a great deal more than becoming familiar with the external environment and accumulating information that contributes to individual survival. Primate societies are complex organizations in which individual animals must perform complex activities, and primate learning has as much to do with sociality as it does with individual survival. It is no coincidence that survival and social competence are synonomous in most primate species.

Hominid and early human archaeology. The hard evidence for ancient hominids, the stones and bones, is unfortunately sparse, and although this has not deterred archaeologists and others from forming hypotheses around the artifacts that have been uncovered, the dearth of hard evidence has always left such hypotheses open to charges of "unwarranted speculation." Interpreters of archaeological material have so little to work with that they must use other frames of reference, such as primate studies and the ethnographic literature on foraging societies, in which paleolithic hominid bones and stone tools can be located. The occasions for error in such a situation

are many and have been pointed out many times (e.g. Lee and DeVore, 1968; Wobst, 1978). Nevertheless, faced with the choice of making interpretations that are plausible (given the available evidence) but unprovable (until more evidence is found), and withholding all interpretation, students of human evolution seem compelled to take the risk; for the links between what has been learned from studying other primates and the behavior of modern humans may only be forged through an interpretation of the archaeological record.

This is not only sketchy work, it is fraught with political overtones as well. In the same way that evolutionary biology has at times become polarized by the possibility of unpleasant extensions of theories of the genetic basis for behavior, models of human evolution built on archaeological evidence may become polarized by extensions of the meanings of artifacts. For example, the longer a characteristic of human behavior or social organization has been around in the hominid family the more "respectability" it has as a possible adaptation of the species. Bipedalism is an ancient hominid adaptation; the fossil evidence indicates that a physiological adaptation for an upright posture is at least 4,000,000 years old. But if bipedalism, which we know is ancient, is closely connected with the development of the human nuclear family, uniquely human sexual behavior, and the sexual division of labor (as it is in Lovejoy, 1981); the interpretation acquires political significance, for these elements of male-female relations are giving us trouble today.

To add to the confusion there have been a number of popularizations of human evolution and our relationship to our primate cousins (e.g. Ardrey, 1966; Morris, 1967) and even "historical" novels (e.g. Auel, 1980) about what our ancestors must have thought and felt.

There is indeed a bewildering complexity of variables in human evolution. Sometime between five and one million years ago a number of significant changes occurred in groups of primates living in East Africa: they became bipedal, used and made tools more purposefully than their ancestors had, began to eat larger game, and utilized home bases. The males and females of these groups evolved a complementary division of labor that included the sharing of food regularly. Female estrus disappeared, males become bonded to the primary matrifocal units, and these families came to constitute the primary units of hominid society. The offspring of these animals were born at an earlier state of development than were the young of other primates, and consequently had a longer period of maturation. Finally, this line developed a large and complex brain.

Many of these attributes may have been prefigured in earlier primate societies in which the animals hunted or scavanged, in which there may have been certain specializations of activity according to gender, and in which tools of one sort or another were made and used (see Chapter 2). But what catapulted these new primates into unique areas of behavioral and social complexity, how extensions of primate characteristics became differentiated into qualitatively different human characteristics, and how these characteristics affected one

another's development are extraordinarily difficult questions. That we are related to these creatures is assumed by all (as it is assumed that we are related to chimpanzees), but the ways in which that relatedness is reflected in our own behavior are open to the wildest speculation. It is in the area of the interpretation of archaeological data that our evolutionary investigations are most vulnerable to personal bias, wishful thinking and logical fallacy.

Studies of nomadic foraging societies. As with studies of other primate groups and interpretations of archaeological evidence, the examination of contemporary hunting and gathering societies for the light they may shed on hominid or early human societies is problematical.

Anthropology itself is a relatively new discipline which grew haphazardly from the observations of Western travelers in different parts of the world. The first anthropologists attempted to bring order to these observations and to integrate them into theories of human social organization. From the discipline's formal beginnings in the late 19th century many anthropologists have operated under the assumption that the so-called "primitive" societies of the world reflect, in some way, an earlier state of human social development -- though there has been little agreement as to what this may mean.

From the perspective of the late 19th - early 20th century heyday of the industrial revolution in which anthropology was born, it was probably impossible for anthropologists to conceive of nomadic

foraging societies as anything but curious carryovers from the stone age. These were, after all, the most primitive people from the perspective of technological development and manipulation of the external environment. They had somehow been missed by civilization and were inferior because of it. They had not progressed, and the theories of human social organization that emerged from the study of band societies with minimal technology often reflect these essentially Western, progress- and property-oriented assumptions.

The assumptions of anthropologists concerning "primitive" societies have undergone wholesale revision in the last 25 years.* In the context of an evolutionary perspective -- often missing in the work of early anthropologists but present in many recent ethnographic studies -- nomadic foraging societies have come to be viewed not as isolated groups that "time forgot" but as representatives of a remarkably successful, stable, and persistent human adaptation that cuts across tremendous environmental variation.

This is not to say that contemporary gatherers and hunters are "stone age remnants" or that they are in any way less human than any other representatives of the species, but only that the nomadic foraging way of life is the ancient framework for human subsistence and social organization within which we have evolved capacities, abilities, emotional systems and social relationships that all humans share. It is now clear that life in nomadic foraging societies is

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*It is conceivable that this revision is related to the perspective one is afforded from what might be called the "down side" of the industrial revolution as well as to increasingly accurate data.

neither nasty nor brutish. Indeed, on the basis of the relatively small amount of time and effort devoted to subsistence and the large amount of leisure available to all, Sahlins (1968) has called gathering and hunting groups the "original affluent society."

Life in nomadic foraging societies is full of the same kinds of human urgencies, difficulties, complexities and satisfactions that characterize life in any human group. Of course, these emotionally charged activities are played out in different ways, in response to different environmental pressures, depending on the particular culture involved, but the kinds of social interactions that people in gathering and hunting societies respond to with intensity, animation and concern are the same kinds of social interactions that command the attention of us all. However, these societies have remained within the gathering and hunting framework.

That framework has all but disappeared from the earth today as other, recently developed social systems have exerted pressure on it, but there is little doubt that a hunting and gathering way of life was the context in which hominids became human and in which we humans have spent the overwhelming bulk of our evolutionary history. There is evidence that our ancient ancestors lived this way (see Chapter 3) and no evidence that they lived in any radically different way. And though we may be sure that the nomadic foraging groups we learn from today are not the same as the nomadic foraging groups that roamed East African savannahs 1,000,000 years ago, it is likely that the framework within which they live is not greatly different.

> The best explanation for the similarities among these [contemporary foraging] groups is that within the gathering and hunting mode, there is a limited set of alternatives to choose from. Any group of people who had to live off the land would face similar ecological problems and would probably invent a roughly similar system. It seems reasonable to suggest, then, that this pattern -- or more properly, this range of patterns -- prevailed in most human societies before the agricultural revolution and during much of the course of human evolution (Shostak, 1981: 46).

In a way the terms "nomadic foraging society," "gatherers and hunters," "hunter-gatherers," and "foraging bands" are misleading, for the peoples of the earth live and probably have lived for many thousands of years somewhere along a continuum which ranges from complete foraging and no domestication of animals to a high degree of specialization, city dwelling in large populations, etc. Indeed, there are societies at various places on the continuum still in existence in many parts of the world today, and one would expect "slash and burn" agriculturalists who keep few animals and move from place to place cultivating small plots of land to have something in common with the gatherers and hunters that are described in this study. However, the intent here has been to describe the framework for social relations and organization that most probably characterized hominid and human groups for perhaps 2,000,000 years before the advent of agriculture and the domestication of animals. Accordingly, the following definition will be used to characterize the nomadic foraging societies discussed in this study.

> We make two basic assumptions about hunters and gatherers: (1) they live in small groups and (2) they move around a lot. Each local group is associated with a geographical range but these groups do not function as closed social systems. Probably from the very beginning there was communication between groups, including reciprocal visiting and marriage alliances, so that the basic hunting society consisted of a series of local "bands" which were part of a larger breeding and linguistic community. The economic system is based on several core features including a home base or camp, a division of labor -- with males hunting and females gathering -- and, most important, a pattern of sharing out the collected food resources.
>
> These few broadly defined features provide an organizational base line of the small-scale society from which subsequent developments can be derived. We visualize a social system with the following characteristics. First, if individuals and groups have to move around in order to get food there is an important implication: the amount of personal property has to be kept to a very low level...
>
> Second, the nature of the food supply keeps the living groups small, usually under fifty persons...
>
> Third, the local groups as groups do not ordinarily maintain exclusive rights to resources...
>
> Fourth, food surpluses are not a prominent feature of the small-scale society...
>
> Fifth, frequent visiting between resource areas prevents any one group from becoming too strongly attached to any single area... (Lee and DeVore, 1968: 11-12).

By this definition groups such as the Northwest Coast Indians of North America -- who obtained their food primarily from fishing and hunting but lived in large, permanently inhabited villages would not be considered "gatherers and hunters," and will not be addressed here. Neither will slash-and-burn agriculturalists who hunt and/or fish to supplement their food supply be included in this study.

In this dissertation ethnographic data on nomadic foraging societies are examined in an effort to identify characteristics of learning that are common to all groups and are related to or different from characteristics of learning that exist in other primate societies.

Particular attention is paid to social behavior and organization, the emotional systems of sociality, and their relationship to learning.

Surely there are a great many problems and controversies associated with an evolutionary perspective on children's learning. However, as Dahlberg says:

> Although the evidence on bones and stone tools is very solid, it is limited in quantity and by its very nature limits what can be deduced about the past. Chimpanzees are definitely not the same as ancient hominids nor are contemporary human foragers. However, by comparing the similarities and differences between other primates and humans, we can deduce some features which the putative ancestor of both species exhibited five or six million years ago (1981: 4).

Method of Inquiry

No primary research has been done for this dissertation, though it is hoped that the material presented here will help describe an original framework within which a great many empirical investigations may be made. A range of data in each of the four areas of study that constitute an evolutionary perspective has been examined, and an attempt has been made to synthesize these relationships in the context of the experience of children in modern school environments.

Organizational Framework and Outline of Chapters

This study investigates the relationships between human social organization and interaction, biologically based emotional systems connected with sociality and the learning of the young, and the activities of learning that have developed in the course of primate and human evolution. Therefore, chapters 2, 3, and 4 are organized in the following manner:

a. description of the axes or most prominent elements of social organization that serve as the context of learning for the young.

b. discussion of how these elements of social organization reflect and fulfill (or, in Chapter 4, do not fulfill) the socio-emotional needs of learning offspring.

c. description of the activities of learning engaged in by the young of other primate species (Chapter 2), the children in nomadic foraging societies (Chapter 3), and children in schools in the United States today (Chapter 4).

Chapter 2 presents a brief overview of the biology of emotion and the emotions of sociality, and the primate base for learning is examined in the context of social structure and socio-emotional relationship. The axes or dimensions of sociality that exist in all primate groups are reviewed in terms of what the young must learn in order to survive in the physical environment and become competent group members, and the motivation to learn itself is integrated with these social emotions and the activities of learning.

Chapter 3 reviews the archaeological evidence for early hominids and humans in the context of the dimensions of sociality identified in Chapter 2 and investigates the relationships between social emotions, social organization and learning in contemporary gathering and hunting societies. The activities of learning in these foraging societies are examined and are compared with activities of learning in other primate societies.

In Chapter 4 the insights gained from an evolutionary perspective on learning are applied to formal education in the United States. This chapter is in three major sections. The first section is a general overview of some of the changes that have occurred in the environment for children's learning between our nomadic foraging past and today. In this section the relationship between intellectual (cognitive) and emotional systems is explored from the evolutionary perspective developed in Chapters 2 and 3, and certain new skills, demanded by the modern technological environment, are identified. In the second section of Chapter 4 the specific environment for and activities of learning found in the majority of public schools in the U. S. are examined and compared with the environment for and activities of learning described in previous chapters. In the final section of this chapter, the ideas of representative authors concerning the purposes and processes of education are reviewed in the context of an evolutionary perspective.

The last chapter of this study presents a set of principles derived from an evolutionary perspective that may be of use in

thinking about and planning for the formal education of children in a modern technological society and briefly identifies promising directions in children's education from an evolutionary perspective.

CHAPTER II

EVOLUTION AND EMOTION, SOCIAL EXPERIENCE AND LEARNING: THE PRIMATE BASE

Since Darwin's landmark study, The Expression of the Emotions in Man and Animals (1872), evolutionists have known that emotional motivators of behavior (i.e. reactions, sensations, responses, expectations, etc.) have been incorporated into the genetic structure of many animals, including human beings.

> We may see children, only two or three years old, and even those born blind, blushing from shame; and the naked scalp of a very young infant reddens from passion. Infants scream from pain directly after birth, and all their features then assume that same form as during subsequent years. These facts alone suffice to show that many of our most important expressions have not been learnt...(Darwin, 1872 [1965]: 315).

That emotional responses to stimuli from the environment (or absence of expected stimuli) represent adaptations within the species rather than simple "stimulus-response" relationships in individuals is generally accepted by evolutionists (if not by all psychologists), but what these responses are in detail, how powerful they may be in affecting our behavior, or how they may interact with individual learning are questions that are only beginning to be investigated. Piaget did not incorporate emotion into his work to any degree, and although Fishbein (1979) postulates a connection between empathy and the development of human reciprocal obligation, he does not investi-

gate the broad range of human emotional systems and their relationship to learning.

It is generally accepted that in all higher animals there are strong internal motivations surrounding reproduction, the perception of threat, and the protection of prerogatives or territory. When the male stickleback is mating, for example, it will attack any red object- no matter what shape or size - apparently because the underside of male sticklebacks during mating season becomes red, and the fish is protecting its territory from potential rivals when it attacks the color red (Tinburgen, 1951). Of course, no one knows what a stickleback "feels" when it "sees red," but it is assumed that some motivational system similar to what humans identify as emotion is at work in the fish (Eibl -Eibesfeldt, 1971). In many animals, especially mammals and birds, there are also particularly strong internal motivations associated with the care of the young.

Emotional systems may be rather deeply canalized, for there is evidence that many of them are mediated by the limbic system of the brain - the area of the brain underlying the neo-cortex and including the thalamus, hippocampus, amygdala, and the pituitary gland. In McClean's model (1955) the limbic system represents an evolutionary process through which the primitive responses to threat and hierarchy, and urges to reproduce, generated in the R-Complex (hind-brain) became elaborated into emotional systems. These systems mediated activities that contributed to the survival of increasingly complex social animals.*

*The neocortex, according to McClean, is a more recent addition to the brain.

> ...emotional processes have served motivational purposes in getting crucial jobs done. What crucial jobs? Finding food and water, avoiding predation, achieving copulation, caring for the young, training the young to cope effectively with the specific requirements of a given environment (Hamburg, 1963: 303).

But the relationship between innate emotional systems and learning is very complex, as Darwin knew. A mosquito needn't learn much in order to survive long enough to fulfill its reproductive mission, but the young of many species, and particularly the primates, must learn a great deal in order to survive and thrive.

> ...but it is remarkable that some expressions of emotion which are certainly innate, require practice in the individual before they are performed in a full and perfect manner...(Darwin, 1872 [1965]: 351).

Few would argue that there are not at least some biologically based responses associated with the care of the young in mountain gorilla mothers, but there is considerable evidence (e.g. Fossy, 1979, 1983; Rock, 1978) that in order for gorillas to become competent mothers they must learn the specific skills of motherhood. This process has been noted in observations of vervet monkeys (Lancaster, 1971) and, to a lesser degree, in rhesus macaques (Harlow and Harlow, 1965). On the basis of this evidence, it is reasonable to suggest that in such cases the emotions involved are somewhat generalized and may serve primarily to motivate juvenile females to be interested in and close to the offspring of other females, form affective bonds with

their own offspring when they become mothers, protect them from harm, etc. The evidence indicates that before the activities associated with these generalized urgings can be completed in a "full and perfect manner," they must become focused by what the monkey or ape learns of the rearing of the young from observation, imitation, and practice (Lancaster, 1971).

Learning serves to refine, extend or complete activities that are originally motivated by emotional systems. But learning is itself motivated by emotion. Young monkeys and apes derive considerable pleasure from investigating their environment, from playing and imitating adults (see below), and similar observations have been made of human children. Although Piaget did not explore the relationship between emotional systems and cognitive development, he acknowledged that these affective systems are the "driving force" behind the development of cognitive structures (Modgil, 1974; see Chapter 4). Children are motivated internally, emotionally, to seek contact and interact with the environment.

It is interesting to refer this discussion of the relationship between emotion and learning to the processes of evolution described in the preceding chapter. Two of the three elements of the epigenetic system are thus far represented: the behavior of the phenotype (the learning of an individual) and the structure of the genotype (the emotional systems). Their interaction is complex, but the addition of the third element of the epigenetic system to the "loop" formed by emotion and learning complicates the relationship even more.

Emotional responses are largely cued by events in the environment. To use the example of the primate mothers above, the emotions of care and concern are released by the presence or absence of the young in a given monkey or ape group, by the presence or absence of threat, etc. Thus learning, a process mediated itself by emotional systems, may extend or complete activities motivated by other emotional systems which may in turn have been called forth by particular characteristics of the environment.

This is, of course, a highly oversimplified description of the interrelationship of learning, genetically based emotional systems and the environment (particularly with reference to higher primates for whom learning makes significant modification of the environment possible. Such modified environments may alter the character of cues that trigger emotional systems). Nevertheless, it may serve as a starting point in the examination of human learning from an evolutionary perspective.

> What is inherited [in higher primates] is ease of learning rather than fixed instinctive patterns. The species easily, almost inevitably, learns the essential, behaviors for its survival. So, although it is true that monkeys learn to be social, they are so constructed that under normal circumstances this learning always takes place. Similarly human beings learn to talk, but they inherit structures that make this inevitable, except under the most peculiar circumstances (Washburn and Hamburg, 1965: 5-6).

Part of a monkey's "construction," so to speak, is in emotional systems that are associated with successful social living. By the

same token, the social environment in which a young monkey grows and develops provides the cues for these emotional systems. The responses and the environmental cues have developed in conjunction with each other in the course of primate evolution. The social environment is a large part of the context for learning among all primates,* for much of what young primates must learn is determined by their relations with other animals in a fairly well-defined social group.

The remainder of this chapter is an investigation of the relationships between the social environment for learning, the activities of learning, and the emotions of sociality that exist in higher primate societies. Lancaster's concept of the "axes of sociality" described in the previous chapter has been used to organize the discussion of the social environment in these groups.

An effort has been made to describe the complexity of the interactions between these dimensions of social experience, for an appreciation of complexity is essential to an appreciation of primate learning. The characteristics of the primate social environment allow and encourage certain activities of learning among the young. These activities are motivated by emotional systems connected directly with the learning process itself and by deeply rooted socio-emotional systems that motivate social behavior generally. The primate social environment reflects these socio-emotional systems, but also, in a reciprocal relationship, calls them forth. Thus, young primates are

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*The other important element of this context is, of course, the physical environment.

motivated to learn not only as "active organisms" but as social beings.

Axes of Primate Sociality

Dominance and dominance hierarchies. Dominance and aggression among old world monkeys and apes is related to the availability of resources, sexuality, and to protection of the group from predators; and there is considerable variation in terms of the importance (measured in the amount of time spent in display, aggression, etc., and the intensity of these encounters) of these behaviors among different species. According to Kummer (1971) the ecological function of dominance is:

> ...to clarify the situation when the same action cannot be carried out by more than one group member. When a resource unit -- a fruit-bearing twig or a sleeping-ledge -- is so small that only one animal can use it, the more dominant animal will take it (Kummer, 1971: 58).

For baboons and gorillas, dominance hierarchies and battles over resources and females are fundamental elements of social organization. Much of the "attention structure" (Chance and Jolly, 1972 -- see below) of the group is centered around the dominant males in these societies. In addition both baboons and gorillas exhibit great sexual dimorphism which is correlated with the importance of dominance as an axis of social organization (Kummer, 1971; Patterson, 1973).

Chimpanzees, on the other hand, appear to place less emphasis as a society on male dominance (though it is still an important

element of social interaction and of the attention structure). This may be because chimpanzee males generally do not play as important a role in group defense as do gorilla or baboon males. Patterson (1973) has noted correlations of sexual dimorphism, the importance of dominance, and terrestrial dwelling. Arboreal species such as the chimpanzee* do not exhibit these characteristics to the same degree -- presumably because the group has less to fear from predators if it lives in the trees than on the ground. But these correlations are somewhat weak for a wide range of primate species (Lancaster, 1975).

In recent years our understanding of dominance and the role it plays in primate societies has grown more complex as more has been learned about how groups of monkeys and apes live in the wild. Devore (1965) observed the formation of a "coalition" among the baboons he studied in which six individuals joined together to increase their collective status. In addition, it has become apparent that an important component of an individual's rank in most primate societies is its mother's rank (Kawamura, 1958 -- see below). Although dominance is seen at its most flamboyant and potentially dangerous in males, females engage in displays of dominance with one another (e.g. Hall and Devore, 1965). It is reasonable to say that all the animals of any catarrhine group have a certain status in a hierarchy that is more or less flexible depending on the species. It may be that in the ground-dwelling species such as baboons and macaques the dominance rankings are less open and flexible than they seem to be in more arboreal species.

*Though recent evidence suggests that the chimpanzee is not as arboreal as was previously thought (Clutton-Brock, 1977).

Although the status of a particular animal in a higher primate group is usually related to the status of its mother, it is possible in most species for a male's status to rise or fall (to a certain degree -- different for each species) according to his individual behavior. Jane van Lawick-Goodall (1971) describes the remarkable use of empty kerosene cans by Mike, a young male chimpanzee in the group she was observing, to enhance his display and, thus, his status in the group. This animal was almost at the bottom of the dominance hierarchy, according to van Lawick-Goodall, when one day he decided to add something new to his display.

> A group of five adult males, including top-ranking Goliath, David Graybeard, and the huge Rodolf, were grooming each other. The session had been going on for some twenty minutes. Mike was sitting about thirty yards apart from them, frequently staring toward the group, occasionally idly grooming himself.
>
> All at once Mike calmly walked over to our tent and took hold of an empty kerosene can by the handle. Then he picked up a second can and, walking upright, returned to the place where he had been sitting. Armed with his two cans Mike continued to stare toward the other males. After a few minutes he began to rock from side to side. At first the movement was almost imperceptible...Gradually he rocked more vigorously, his hair slowly began to stand erect, and then, softly at first, he started a series of pant-hoots. As he called, Mike got to his feet and suddenly he was off, charging toward the group of males, hitting the two cans ahead of him. The cans, together with Mike's crescendo of hooting, made the most appalling racket: no wonder the erstwhile peaceful males rushed out of the way (pp. 122-123).

Utilizing and improving this technique, Mike rose through the dominance hierarchy of the group to the foremost position in a short period of time.

Van Lawick-Goodall explains Mike's use of the cans as "an indication of superior intelligence," and it is interesting to contemplate the role intelligence may play in dominance hierarchies. Apparently, a great deal more than simple brute force is involved in primate dominance structures.

In order for dominance hierarchies to be useful rather than destructive to a group of primates they must allow the animals to predict the outcome of certain kinds of encounters (Kummer, 1971) so that time and energy are not wasted in fighting that could lead to injury or death (which in turn could, in some species, leave the group unprotected). For this reason most aggression between males and males, between females and females, and between males and females is "ritualized" (Eibl-Eibesfeldt, 1971), full of display and threat, and it is rare that all-out battles take place. However the intensity and danger of these encounters vary from situation to situation and among different species. Newly dominant gorilla males have been observed killing the offspring of the previous dominant silverback (Fossey, 1979).

But in every species of higher primate, as in many other mammals, the males not only contend among themselves but also protect the group from predators. Among the open-country baboons it is not uncommon for a group of males to interpose themselves between a leopard and the rest of the troop, displaying their ferocious canines (Kummer, 1971). Arboreal species that must fear predation (not including the chimpanzee who seems to have only humans to fear -- Reynolds and Reynolds, 1965) often use what Kummer (1971) calls the "patas pattern."

> They do not face an approaching danger as a group. Instead the alerted male climbs into the upper branches of a tree from which he scans the area. From this exposed vantage point, his size and the white color of his thighs make him rather conspicuous. His further behavior in the presence of a human observer suggests that his role is not only to watch for danger, but also to divert attention from the group... As the male engages in such distracting displays, the females and juveniles silently remain in their places... (Kummer, 1971: 52).

Dominance is also associated with access to mates and with the "attention structure" of the troop (see below).

The matrifocal unit. For many years the characteristic of primate social organization most obvious to researchers was male dominance and aggression. Lancaster (1975) indicates that this focus was probably inevitable given the fact that adult male behavior is usually the most conspicuous and "attention getting" behavior in a group of primates and that until recently field studies were short term and tended to miss some of the more subtle elements of primate social organization. Later work (e.g. van Lawick-Goodall, 1971; Koyama, 1970) has shown that perhaps the most pervasive and enduring elements of primate social organization are those that revolve around the relationship between mothers and their offspring.

Twenty years ago the Harlows demonstrated the importance and strength of the bonds between rhesus macaque mothers and infants in a series of laboratory experiments (Harlow and Harlow, 1965; Lewis and Sackett, 1980). Infant macaques were raised in varying degrees of isolation: with biological mothers, with surrogate mothers made

of cloth, with surrogates of wire, and in bare wire cages without a surrogate of any kind. In addition to varying the amount of contact between infants and their mothers or various mother surrogates, the Harlows varied the amount of exposure these infants had to other infants - their age mates. The results of these experiments and others in succeeding years are summarized by Lewis and Sackett (1980):

> Broadly speaking, the degree to which rearing departs from situations in which mothers and peers are freely available to the developing rhesus monkey predicts the degree to which that monkey will be abnormal or deviant in most behaviors as a juvenile and adult. Isolate and wire cage reared animals are abnormal in all areas of behavior, except for the ability to perform on standard monkey learning tests. In fact, learning performance does not appear to differ between rearing conditions ranging from wild-born to total isolate. Thus, early rearing experiences involving social privation appear not to influence basic "intellectual abilities." However, the deprivation-raised animal's willingness to perform on learning tasks is markedly deviant.
>
> Deprivation of maternal contact [but with adequate exposure to peers] during infancy yields rhesus monkeys that show heightened self-orality and fear behaviors, although play and aggression are fairly normal, as are sexual and maternal behaviors. Thus, peer contact appears to be a sufficient condition for development of typical rhesus monkey behavior, regardless of the presence or absence of a real monkey mother.
>
> Rearing monkeys with mothers but with no peer contact produces animals that shy away from physical contact with other monkeys, showing hyperaggression toward others when touched but apparently normal sexual and maternal behavior. Thus, although the mother may provide sufficient stimulation for the development of some normal adult behavior, maternal stimulation alone is inadequate to produce fully normal behavioral development under laboratory conditions (pp. 116-117).

Field studies have corroborated the laboratory findings concerning both the importance of mother-infant contact and the importance of

contact with age-mates (see below) in the development of young primates. In many societies the offspring continue to recognize their mothers into adulthood. Sexual relationships between mothers and sons are exceedingly rare among higher primate groups for which such information has been collected, though father-daughter and brother-sister relations are quite common (Itani, 1972). Sade (1965) has shown that although the very close and often intense relationship between mother and infant changes after weaning, it does not end.

The importance to the group of the complex of relationships that revolve around the matrifocal unit in many primate societies has been demonstrated by studies of group movements and "travelling arrangements." Kummer (1971) reports that although mountain gorilla groups appear to be led by a single silverback male, most other primate groups are "led jointly by several adults" both male and female (p. 63). Lancaster (1975) suggests that the greater stability of females as members of most primate groups* probably provides them with a more accurate knowledge of the group's range than the males (who are usually more mobile between groups) are likely to have. Rowell (1969) has offered the hypothesis that the usual traveling configuration of baboons, in which adult males occupy positions at the head of the moving troop and supposedly make the decisions about the direction the troop will take, has been misinterpreted. His observations have led him to believe that decisions about where the

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*Chimpanzee females do considerably more traveling from group to group than do the females of other primate species.

troop should go are most probably made by the older, higher ranking females in the group's center. These messages are then relayed throughout the group by males (usually those closely related to these "indicator" females -- brothers or sons).

Long-term studies of primate societies such as those of the Japanese Monkey Center (e.g. Koyama, 1970) indicate that the status of individual animals in a group is intimately connected with the position of large-scale "matrilinear geneologies" that remain relatively stable for long periods of time, and Lancaster (1975) has observed similar relationships among vervet monkeys. Indeed, in most primate societies the offspring of high ranking females tend to be more dominant (whether male or female), while the offspring of females with lower rank tend to remain at that level (Harlow and Harlow, 1965). The relationships between dominance hierarchies and the complex of ties, recognitions and attachments surrounding matrifocal units are only beginning to be understood, but it is clear that:

> matrifocality is a principle of primate social grouping which is different from but just as important as a dominance hierarchy, and in many primate societies these principles form crosscutting ties which bind individuals into the social group (Lancaster, 1975: 31).

Male-female relations and roles. In most primate species the bonds between adult males and females are strong only during female estrus. At that time male and female behavior alters dramatically in every species, and among the chimpanzee preferences may even develop between

males and females that seem to be reciprocal. Van Lawick-Goodall describes two such arrangements between males and females (1971). However, these pairings apparently last for the length of the estrus cycle only, after which the animals go their separate ways.

The two major exceptions to this generalization were mentioned in Chapter 1 -- the gibbon and the hamadryas baboon -- and, as noted there, these forms of social organization seem to be particular adaptations to particular environments. It is interesting to note that even though these primates live in groups in which the same males and females are bound together for long periods of time, nothing resembling reciprocal bonds have developed. The hamadryas baboon male jealously guards his harem from intruders, but the hamadryas females have no "loyalty" to the male and are quite willing to copulate with any available male when in estrus (Kummer, 1971).*

The specific roles that males and females play in primate societies vary according to species and, of course, to the environment in which the animals live. The male hamadryas baboon bullies females into following along and keeps checking periodically to see that they're close behind, while the male chimpanzee pretty much goes his own way and moves among permeable groups. Macaque females may band together against a male if he has frightened an infant, but hamadryas baboon females demonstrate no such behavior. Nevertheless, it is possible to identify certain broad male-female roles that occur in

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*The other exception which should be mentioned here is the as yet little understood connections between mothers and their male relations.

all primate societies: (1) females have specialized roles in relation to the care and welfare of the young and (2) males have specialized roles with respect to group protection from external danger.

The females of any catarrhine society are the primary parents of any infants that are born into the group, and interest in the young seems to be generalized throughout the female population of any primate society.

> ...strong maternal behavior has been observed in prepubertal female monkeys. Preadolescent females, indeed all females, show a deep and pervading interest in newborn infants and a compulsive desire to make gentle physical contact with them whenever this is possible... Furthermore, preadolescent females readily assume adult-type maternal responses to infants as soon as the mother permits the infant to be taken for brief periods of time (Harlow and Harlow, 1965: 303).

Although males of all species spend time with infants, play with them and demonstrate great interest in them generally, they should probably be

> ...regarded as generalized fathers: they show affectional responses to members of their social group but do not show them differentially to their own or to other children. The dominant males when such exist in fairly large groups, protect all members of their social group against aggression at the risk of their own lives (Harlow and Harlow, 1965: 330).

In spite of occasional instances in which adult males will adopt orphaned infants (often their own siblings -- e.g. van Lawick-Goodall, (1971) and their willingness to play with infants (e.g. Schaller,1965)

they apparently form no lasting attachments with the young, and their interest in juveniles wanes quickly as the latter reach maturity. Dominant males easily become short-tempered with juveniles -- particularly other males -- and threaten them off.

The primary specialized role of males in catarrhine societies is group protection. Females will aggressively protect their own offspring from not only intruders but from other animals -- male and female -- in their own group as well, but the male protectiveness seems to be generalized to the entire group.

Although the care of the young and the protection of the group may represent generalized role specializations (if such a phrase is not too confusing) in primate societies, there seem to be other roles, related to dominance and the matrifocal unit, that are divided in some degree (but with different emphases in different species) between males and females. In many dominance oriented societies, for example, dominant males play what might be called indicator roles (Chance and Jolly, 1970). They relay information to every member of the group through the attention structure. At the same time, as we have seen, dominant females may play similar indicator and information disseminator roles in primate societies, yet the information is relayed to other members of the group through a different network. In some species the dominant males play a kind of enforcer role in order to maintain social order (Harlow and Harlow, 1965), while in other species coalitions of females may at times perform a similar function (Lancaster, 1975).

Part of the complexity of the learning that young primates must do is in the gender roles they acquire as they grow. Although these roles appear to be rather undeveloped among most species, with the females providing primary parenting and the males providing primary group protection, there are some remarkable examples of male-female role specializations among chimpanzees (and to a lesser extent among baboons) that are of particular interest since they may be examples of "precursors" of behaviors which for many years were thought to be exclusively human: the use and manufacture of tools and the procurement, distribution and eating of meat.

It has been known for some time that chimpanzees (and other primates) use tools in various activities. Male chimps and gorillas, and occasionally baboons, pick up sticks to brandish in display and often throw sticks and stones at intruders. Since van Lawick-Goodall first observed chimps termiting, the behavior has been observed among several populations throughout Africa. Not only do the animals use sticks as tools to probe into termite mounds, they modify sticks for the purpose as well. In other words, chimpanzees make tools with what can only be a future knowledge of their use.

It is only in recent years that what seem to be gender specializations have been observed in these activities involving tool use. The Boesches (1981) observed such a specialization in connection with the cracking of coula and panda nuts by chimpanzees in the Tia National Park of the Ivory Coast. These animals use stone or wood hammers and anvils to crack open the nuts. The panda nuts are so hard that only

stone hammers may be used, and the animals carry these hammers rather long distances in order to crack the nuts -- further evidence for some sort of forethought. Sometimes the coula nuts are cracked in the trees -- a much more difficult task which requires considerable agility.

The Boesches discovered that two techniques -- the cracking of panda nuts and the cracking of coula nuts in the trees -- were used almost exclusively by females. Further evidence for a gender specialization in activities connected with tool use has been provided by McGrew (1979) who noted that female chimpanzees spend more time termiting than males do.

The activity that is engaged in more by males than by females (and which is also, but weakly, associated with the use of implements) is predatory behavior or hunting.

For the most part catarrhines are independent foragers for fruit, nuts, leaves, and other vegetable material. Many species eat insects and eggs, but characteristically, the group moves through its range at a leisurely pace, each member pausing to eat whatever it finds immediately. The very young cling to their mothers, and the juveniles play as they feed. There is usually nothing set aside for another time or carried from one place to another (although the carrying of food by chimpanzees has been observed -- Harding and Teleki, 1981). However, since first meat-eating and then hunting by chimpanzees were first observed by van Lawick-Goodall in the Gombe National Park in the early 1960's these behaviors have been witnessed so often that:

> Whether we postulate that internal psychological or social motivations underlie their predatory proclivities, or hypothesize that a vacant niche lacking competitive large carnivores (except the occasional leopard) is being filled by these omnivorous apes, Gombe chimpanzees emerge as competent, skilled predators whose impact on the local fauna is greater than anyone expected (Teleki, 1981: 327).

Teleki (1974) distinguishes between "opportunistic" predatory behavior in which a prey animal is flushed and caught by the chimp that comes upon it, and deliberate "searching or stalking activities [which] precede the capture" (1974: 50). Van Lawick-Goodall (1971) describes what seemed to be a remarkably well-coordinated hunt in which several males participated. Strum (1981) has observed "simple" and "complex" hunting among baboons in Kenya.

> Simple hunting required active searching and either stalking or chasing of the prey. It involved only one baboon predator, pursuit lasted less than 10 minutes, and the distance the predator traveled from the troop was less than 300 m. Complex hunting involved more than one predator, the pursuit lasted more than 10 minutes and the distance the predator traveled to contact the prey ranged from 300 to 1,700 m., although the predator might travel up to 4,000 m. during the course of the hunt (Strum, 1981: 259).

Strum reports that adult males, females and juveniles all captured prey during the period of her observation, but that only adult males engaged in complex hunting. Teleki reports that "less than 4% of the chimpanzee kills documented in Gombe National Park have been made by adult females and adolescent males" (1981: 335).

One of the most remarkable aspects of chimpanzee behavior

surrounding the consumption of meat is in the way it is often divided within the troop. Other animals approach the adult male or males that have made the kill and "beg" a piece of the carcass using a characteristic open-palm gesture (van Lawick-Goodall, 1965, 1971). Other males, females, juveniles and even infants have been observed begging in this way -- often for long periods of time until rewarded -- and van Lawick-Goodall has concluded that because "meat is a much liked, much prized food item" (1971: 207) it elicits from the whole troop a number of behaviors that are radically different from usual subsistence activities: the hunting, the begging gestures, and what may be considered the sharing of food. Strum has observed baboons feeding on a carcass they have killed move to one side to allow others access, and she interprets this behavior as a kind of sharing (Strum, 1981).

Whether these gender-specific behaviors surrounding subsistence actually represent behaviors which existed in pre-hominid primates 4,000,000 years ago or not is a question we will never know the answer to. But of one thing we may be certain: the learning that the young of all primate species do is connected with gender identity in some way, and in certain species, notably the chimpanzee, the gender specific behaviors that the young must learn are quite complex.

The importance of the young and the roles they play. The young of any primate group provide an intense focus for all the animals in that group. As we have seen, adults and sub-adults, both male and female, are drawn to infants and play with them; and there is a particularly close and lasting relationship between a mother and her offspring. Juvenile females are extraordinarily interested in the young no matter whose they are, and this interest is an important component of the learning these juveniles must do in order to become competent mothers themselves.

The intense focus upon offspring also provides a context in which adolescent males, who will eventually protect the group from predators, learn their priorities. In order to facilitate this focus, the infants of all species look rather different from adults, and ethologists see in these visual cues "releasing mechanisms" that elicit particular emotional responses from adults.

> In all mammals the young of the species transmit specific signals that release cherishing behavior. These can be olfactory, acoustic, or optical, although among primates optical infant signals acquire increasing significance. Young baboons have black coats up to their sixth month. The black coat elicits help and friendly interest from the adults. Even old males will take a young baboon to clean it and help it if it is attacked. Young vervet monkeys also have a coat coloration that distinguishes them from adults. Male vervets will even attack men who lay hands on a young one with this coat. They will not, however, come to the rescue if the conspecific caught is a young vervet that has lost its baby coat... (Eibl-Eibesfeldt, 1971: 123).

This extraordinary interest in the young by adult primates and

the length of time this interest lasts is probably related to the extended vulnerability of primate infants. Unlike many other mammals catarrhine young reach maturity relatively slowly, and it is felt by many (e.g. Washburn, 1961b, Harlow and Mears, 1979) that this extended maturation period is connected with the amount of learning a young monkey or ape must do in order to survive and thrive in both the natural environment and in rather complex social situations and to be a competent member of the group. In this connection it is reasonable to conceive of the primary role of the young in all primate societies as that of the learner.

The social environment for learning as the "attention structure."

One way to acquire an understanding of the relationship between the learning of the young in a given primate society and the axes of sociality that exist and are emphasized in that society is to describe the "attention structure" of the group (Chance and Jolly, 1970): Who pays attention to whom and why?

Dominance is one important element of this attention structure in all catarrhine societies, but this importance varies according to the importance of dominance and dominance hierarchies as principles of social organization. In baboons and gorillas, for example,

> The dominant male's behavior...suggests that it is designed to demand attention when, for example, by standing motionless with legs spread, he indicates his readiness to leave a nest area... This fixated attention of subordinate animals would then also be the mechanism by which the dominant male determines the character of group activities (Chance and Jolly, 1970: 104).

The younger or lower-ranking males are particularly aware of what the dominant animals are up to in these societies: where they are looking, how they move, etc.; and explanations for this behavior tend to emphasize the "adaptiveness" of paying attention to dominant males (e.g. Lorenz, 1966; Wilson, 1975). The dominant males of many catarrhine species are usually the most fit in that they have the most offspring. They also bear primary responsibility for group warning and defense. Thus it probably is advantageous for every member of the group to pay attention to what the dominant males are doing or reacting to.

However, as we have seen, the most pervasive influences in many catarrhine social groupings are the relationships of the matrifocal unit, and these relationships form another significant dimension of the attention structure in any primate group. Infants watch their mothers intently at a very early age and begin to learn almost at once (first by observation, later, through play, imitation and investigation -- see below) what is good to eat, what is dangerous, who is safe to be around, who is dangerous, who is a reliable playmate, etc. As infants develop, more and more of their attention is directed outward, to a variety of foci including age mates, subadults, dominant males, dominant females and so forth, and it is through the complex connections rooted in the matrifocal unit that the young first learn about their world and what is expected of them in it.

But the attention structure of any group of primates seems to be even more complex than the monitoring of the behavior of dominant

males by other animals in the group and the reciprocal attention between mothers and their offspring. Kummer (1979) attempts to expand the notion of primate social interaction by creating a "heuristic scheme" for understanding

> a society's qualitatively unique elements, which is the relationship between two individuals. What are the marks of valuable relationships? How do they benefit their members? And what can an individual do in order to establish and maintain them? (Kummer, 1979: 381-382)

In order to get at some of these questions, Kummer maintains that the value of a social partner may be ascertained in terms of his or her qualities (i.e. sex and age, strength, skill, experience); tendencies (i.e. tendencies to perform acts that increase or decrease another animal's success such as fighting against or with another animal, etc.); and availability (i.e. external factors that influence the interaction such as distance separating two animals or the presence of third parties) (Kummer, 1979: 384).

Kummer's scheme suggests that while the attention structure of all primate groups is probably connected in some way to both the behavior of dominant males and the matrifocal unit, it is also likely that one individual animal may pay attention to another for a variety of reasons. Further, primate social interaction includes a kind of "feeling out" process in which the behavior of one animal is monitored by another and certain assessments are made in the course of daily encounters, whether or not these encounters take place specifically

in the context of the dominance structure or the matrifocal relations. Perhaps this accounts for the chimpanzee preference pairings observed by van Lawick-Goodall or for the dramatic rise by the young chimpanzee Mike in the dominance hierarchy. Indeed, the environment for learning in all primate societies is exceedingly complex and demands a great deal from the young. Social competence among primates is much more than reacting to stimuli or simply following a genetic behavior program, and learning is the key to this competence.

Activities of Primate Learning

The young of all primate species learn by doing -- by observing, trying out their observations (imitating) and testing their abilities in play, and by purposefully investigating the environment in which they live (including the qualities, tendencies, and availability of other members of the group).

Shortly after the "reflex period" (Harlow and Harlow, 1965) of infant development catarrhine young begin to look around, first observing their mothers' behavior, then widening their attention to include other members of the group. They begin to focus more intently on environmental events and the activities of others.

But do catarrhines actually learn from this observation? "This question has been asked repeatedly since the beginning of animal experimentation in learning. The answer is that some primates unquestionably can learn by observing the actions of others" (Butler, 1965:

489). Butler offers an account of an experiment by Darby and Riopelle (1959):

> In their experiment, one rhesus monkey observed another perform a long series of two-choice visual discrimination problems for food reward. The demonstrator would make a choice, the discriminanda would be returned to their original positions, and then the observer would be permitted to respond. The performance of the observer improved as the experiment progressed. What is exciting about this experiment is that the observer obtained more information about a particular problem when the demonstrator made an incorrect response than when it responded correctly. This means that the observing monkey was not merely repeating the acts of the demonstrator; it was responding to the consequences of the demonstrator's behavior (Butler, 1965: 490-491).

Thus it appears that not only are catarrhines able to learn from observing the behavior of other animals, they are able to interpret mistakes and inconsistencies in the behavior of others and modify their own behavior accordingly. Surely outside the laboratory these rhesus macaques would use this impressive capacity in the kinds of social monitoring and assessment processes identified by Kummer.

But the primate infant is far from a passive observer. From birth it has engaged in a strong physical and emotional interaction with its mother, and as it grows it extends this interaction to other members of the group and to the external environment. Young primates play ("Indeed, when [young chimpanzees] are two or three years old it often seems that they do little else" -- van Lawick-Goodall, 1971: 163). And it is through the activities of play that the young of all catarrhine species learn much of what they need to know in order

to survive and be competent group members.

> Play repertoires of young monkeys contain the origins of most adult social behaviors. Patterns of social grooming dominance, aggression, and sex are clearly evident in monkey play activity, though not at competent adult levels. At first clumsy to the point of being ridiculous, months and even years of practice at play produce the adult product (Harlow and Mears, 1979: 145-146).

Field evidence (e.g. van Lawick-Goodall, 1965, 1971) corroborates the laboratory observations that play includes segments of adult behavior that the young are trying out. Play is an endless repetition of roughhouse, mounting, aggressive display, etc. in all possible combinations.

Imitation of adults is an important aspect of the play of young primates, yet given the complexities of social behavior and learning outlined by Kummer (1979) and Butler (1965) it is reasonable to assume that young animals develop individualized connections with one another as well.

> [during aggressive play encounters] firm peer relations establishing dominance position and social status develop. Many status relations are formed, primarily among the young males and among the young females. Once formed, they tend to remain stable for long periods of time (Harlow and Harlow, 1965: 313-314).

We have seen that when young macaques are deprived of age-mate contact they develop abnormal behavior patterns, and given the importance of the relationships that are established and the learning

that is done through play this is hardly surprising. Though broadly cast in terms of the large-scale axes of social organization -- reproduction, dominance, and the matrifocal unit -- the specific relationships between individual animals appear to be formed in age-mate play. Infants and juveniles imitate adults, but, as we have seen, they are also capable of learning by not imitating adults.

Monkey and ape curiosity is legendary, and young primates exhibit investigative behavior (Butler, 1965) in common with the young of many other mammals.

> Both curiosity-exploration and play behaviors develop along similar maturational courses. Social play progressively burgeons after curiosity is well under way, and each successive stage of curiosity is followed by new social developments (Harlow and Mears, 1979: 146).

The young primate is impelled to seek contact with the external environment and with other animals in the group.

> Novel sensory input has reinforcement properties for primates. Although extremely novel stimuli tend to be aversive, moderately novel stimuli tend to be aversive, moderately novel stimuli have the properties of positive reinforcers and can condition higher frequencies of those operant behaviors which commonly precede the novel inputs. Exploration, play and innovative behavior all tend to produce novel experiences and hence are reinforced by the novelty effects. If a primate repeats activity X without variance, it produces less novelty and hence will receive fewer novelty reinforcers than if it repeats the activity with variance. Thus, novelty reinforces animals for varying old patterns, for innovating, for creating new patterns. Young primates tend to be influenced by novelty reinforcers more frequently than older animals because older individuals have already explored most of the possibilities in their

> environments and (due to familiarization) ceased to find most things novel. It is the young who still have the greatest amount of untapped novelty to explore and who are more frequently reinforced by novelty reinforcers for further exploration, play, and creativity. Hence, younger primates tend to generate a higher frequency of the explorative and playful behavior which may lead to useful innovations. The habits of exploration, play and creativity tend to be extinguished and replaced by less variable routines by middle or late adulthood (Baldwin and Baldwin, 1979: 103).

Here are echoes of Piaget and Bateson. A young primate is an active organism which is internally motivated to interact with its environment. Another way of describing the gradual reduction of the explorative and playful behavior might be the "gradual achievement of equiibrium."

It is important to note that nothing that could be construed as instruction occurs in the primate learning process. To be sure, primate mothers seem to control the timing of weaning and the introduction of solid food to their offspring (Butler, 1965), but in no other way do adult primates directly influence the learning of the young. Indirectly, however, the environment of learning is influenced greatly by adult behavior. In order for primate young to spend as much time playing as they do it is important for them to have a safe and secure environment. Constant threat either from without the group or from animals within will make the kind of abandoned interaction that characterizes primate play impossible (Harlow and Mears, 1979). It is only in the context of the protection and security afforded by the adults of the group that the young can afford to do the learning they must do.

The studies made at the Japanese Monkey Center (Itani, 1958; Kawamura, 1959; Kawai, 1965; and Koyama, 1970) have been summarized by Lancaster (1975) and offer a remarkable example of how learning may occur in a primate society and how information is disseminated along the axes of social organization through the attention structure of the group.

In 1952 sweet potatoes were thrown on a sandy beach on Koshima Island for the Macaques living there, and although the monkeys were quite fond of the potatoes they were bothered by the gritty beach sand which wore down their teeth and tried to brush it off. Approximately a year after the potatoes first appeared, a juvenile female (one and one-half years old) acquired the habit of washing her potatoes in the sea before eating them.

The observers traced the spread of this innovation carefully. The first animal to learn the potato-washing trait from the juvenile who invented it was her mother.

> This is understandable, since practically the only adult animal to be interested in the behavior of a one-and-one-half-year old female is her mother. Once the mother had adopted the behavior then it passed naturally to all her subsequent offspring. An older sibling of the juvenile innovator learned the behavior several years later, probably from watching her young sister. The main line of diffusion of sweet potato washing was through the play group of the young female. Some of her playmates were interested in her behavior, observed the potato washing, and began doing it themselves. Their mothers and older siblings then learned it and so the habit passed through other geneologies. Eventually, through the attention structures of the matrifocal units and the play group all but 13 monkeys (mostly adult males) had learned to wash potatoes. The adult males were not resistant to the idea

> on principle; they simply did not notice what was going on in a way that would affect their behavior (Lancaster, 1975: 45-46).

In this example we see how adaptive flexibility may be enhanced through learning. The gritty sand on the potatoes not only tasted bad but wore down the animals' teeth and would have reduced their ability to include certain foods in their diet eventually. We also see an example of the essential conservatism of the attention structure.

Several years later piles of wheat were dumped on the same beach and the same female discovered a way to remove the sand from it by sluicing handfuls of the wheat into pools of water. The wheat floated, the sand sank, and the animal could eat by simply skimming the wheat off the water. Interestingly enough, this innovation, too, took years to spread through the group. After three years only 14 out of 58 animals had learned the new technique.

By contrast when wheat was given to another monkey group in which the only animal familiar with the new food (and also familiar with the sluicing technique) was a dominant male, the innovation spread through the group -- from the male to other dominant males, then to the dominant females, and from there, through the dominance and matrifocal pathways to all the animals in the group -- within a matter of hours (Kawai, 1965).

The "monkey genius" of Koshima Island at no time engaged her peers or her mother in ways that might be interpreted as demonstration behavior. She did not show them how it was done, and at all times the

responsibility for learning the new technique and modifying their own behavior accordingly rested solely with the observers.

In this example we may catch a glimpse of the complexity of primate social organization and interaction and its relationship to learning. The importance of dominance and dominance hierarchies to the attention structure of this group of macaques is demonstrated by the rapid diffusion of the wheat sluicing technique through a group of monkeys when the innovator was a dominant male. At the same time what might be called the conservative nature of dominance hierarchies may be supposed from the inability of the adult males in the original group to pay attention to the sweet potato washing technique even though it was advantageous for them to do so. One might assume that a general lack of interest on the part of all adults would be related to the replacement of novelty with established routines noted by the Baldwins (or the gradual acquisition of equilibrium noted by Piaget). But on the basis of the Koshima example dominance hierarchies seem to affect the attention structure of the group in such a way that information can flow through them only in one direction -- from top to bottom. Only very gradually does information work its way from bottom to top.

As we have seen, such an arrangement is probably adaptive for the group, and it is important to note that there was no resistence to the new technique on the part of the adult males who did not pick it up. In other words they did not view the new technique as a threat to their status and attempt to suppress it. Indeed, there is a good deal of evidence to suggest that dominance hierarchies are somewhat

self-contained dimensions of primate social interactions which may remain relatively unaffected by interactions in other dimensions. Lancaster (1975) reports that when coalitions of female vervet monkeys chase males away from infants, the males' status in the dominance hierarchy is unchanged. Van Lawick-Goodall reports that the presence of meat in a chimpanzee group may temporarily alter the workings of the dominance structure, but the status of individual animals is unaffected by these events.

The other great dimension of primate social organization is the matrifocal unit, and in the Koshima example we see that although the interactions in this dimension seem to be more subtle and long-term, they are no less important. The stability of the matrifocal geneologies in macaque groups suggests another sort of conservatism at work in these societies; however, it appears that matrifocal relations admit a two-way flow of information. The mother of the juvenile female innovator was the first animal to learn the new technique, and all her subsequent offspring learned to wash potatoes, presumably from watching her. The next animal to learn the potato washing technique was the innovator's older sister (a member of the same matrifocal unit) who apparently learned the technique by observing her younger sister and/or her mother. It is interesting to note that through the matrifocal pathways information could flow from a younger animal to an animal of a different generation and to an older animal of the same generation -- even if the elder sister didn't learn the technique for some time.

The importance of the play group as a context of learning in this macaque society is demonstrated by the fact that it was the "main line of diffusion of sweet potato washing." Although a play group in any primate society exists in the larger context of dominance structures and the relations surrounding the matrifocal unit, it appears from this example that the young form individual attachments and connections. Not all the young animals in the juvenile innovator's play group learned the new technique at the same time, and it is reasonable to surmise that this was because some paid more attention to her behavior than did others. No doubt this differential attention was affected by the status of the innovator in terms of her matrifocal geneology, but it is also likely that she formed a complex of attachments in her play group that affected the attention structure, mediated the flow of information throughout the group, and could only be anlayzed in terms of Kummer's heuristic scheme (if at all).

The juvenile female who invented the sweet potato washing technique demonstrated the capacity of primates to explore, to investigate their environment and to learn from and regularize their experiences. It is significant that the same animal invented wheat sluicing, for the repetition of this inventiveness indicates an individual capacity different, in some way, from that of her peers. It is also significant that the innovator of Koshima Island was a juvenile, for as we have seen young animals are more inclined to experiment and explore than are older animals.

The learning of all primates occurs within a broad context that incorporates several axes of social organization, or dimensions of collective experience. The relative significance of any one of these dimensions varies from species to species, and perhaps from group to group within species, but all are present in every catarrhine society and all have a certain impact on the social context in which the young learn. Without doubt, the social interactions of higher primates are very complex, as Kummer suggests, and most likely represent not only the blending or intersection of the broad axes of social organization but the learning of individuals as well. The net effect of this interaction is a dynamic balance that is analogous to (1) the stochastic nature of the processes of evolution themselves, (2) the balance the subsistence group develops with the natural environment, and (3) the learning process of individuals as described by Piaget.

It is important to note that the potato washing innovation, discovered by a young monkey, spread thoughout the group very slowly. After ten years there were still animals in the group that had not learned the "new" technique. This suggests that the exploratory behavior of the young takes place in a context that is fundamentally conservative. Matrifocal geneologies change very slowly (Koyama, 1970), and although dominance hierarchies may respond more readily to individual initiative they too are conservative in that information flows through them only in one direction. Thus, while the young may present the group at large with a great many innovations come upon in play or exploration, these are incorporated into the larger group

only over time. It is as though elements of the structures of social organization and attention had evolved to ensure that before a behavioral innovation becomes generalized throughout the group it is well tested.

Primate Learning and the Emotions of Sociality

Early in this chapter it was stated that learning, and indeed all activity, is mediated to some extent and in some manner by genetically based emotional systems, and the overview of the social context of primate learning presented above makes the identification of at least three of these emotional systems possible:

a. the emotions surrounding attachment, belonging, security.
b. the emotions surrounding status, place, prerogative.
c. the emotions surrounding the processes and activities of learning.

It is important to note here that although these systems of response, expectation, and motivation may be separated for the purpose of analysis, they function all together, interacting according to the situation presented by the social and/or physical environment.

Attachment, belonging, security. Washburn and DeVore (1961a) have described the adaptive value of baboon group living in terms of survival:

> When the troop moves out on the daily round, all members must move with it, or be deserted. We have seen sick and wounded animals making great effort to keep up with the troop, and finally falling behind. At least three of these were killed, and the only protection for a baboon is to stay with the troop, no matter how injured or sick. In wild primates injuries are common...and animals which are so sick that they can be spotted by a relatively distant human observer are frequent. For a wild primate, a fatal sickness is one which separates it from the troop (quoted in Hamburg, 1968: 253-254).

But though the feelings that bind animals to the troop and encourage them to keep up and seek security among one another certainly have a fundamental connection with survival, they are elaborated far beyond simple fear and are apparent in the binding processes that go on in all axes of primate social organization.

The emotional systems connected with dominance and aggression play a fundamental role in status and place relations, of course, but they also provide motivations toward the protection of the group and thus serve as binding agents. Both males and females rush to protect the young, and as noted above the appearance of the infant is a releasing mechanism (Eibl-Eibesfeldt, 1971) which elicits highly emotional responses in the adults in certain situations. Van Lawick-Goodall reports that on several occasions when the chimpanzee troop she was observing began to hunt young baboons actively, male baboons appeared immediately and engaged in aggressive (though bloodless) tussles with the male chimps. Most of the time, the young baboon escaped in the confusion (1971). These impulses to protect the young offer the great benefit of security. This security, as we

have seen, is vital to learning in that it allows the young the unencumbered time to experiment, to practice, refine, and to explore the world around them.

Most prominent in terms of the emotional systems of attachment, belonging and security are the relations that surround the matrifocal unit. We have noted the intensely emotional state of infants separated from their mothers, the corresponding distress of mothers separated from their offspring, and the powerful draw that infants have for all females of any primate group. These emotional attachments are extended, to some degree, throughout matrifocal units or geneologies as the infant grows, but an emotional attachment to the mother remains well into adulthood. The evidence suggests that when coalitions among primates form they develop in terms of matrifocal relationships and no doubt these "agreements" are motivated by emotional attachments formed in the context of the matrifocal unit.

The emotions surrounding reproduction draw males and females to one another during female estrus, and no doubt this attraction reflects deeply canalized responses to internal and visual cues. The estrus swelling of the female in all primate species is a releasing mechanism that sets off powerful responses in even infant males (van Lawick-Goodall, 1971), and within the context of these overwhelming motivations other, individual attachments may develop. Even though these individual attachments appear to exist only in the context of female estrus, they, like the more fundamental attachments of reproduction, bind animals together into a social group.

Finally, emotional connections are probably developed, in some sense, among individuals in a group. There are no neutral observers in a primate society; every animal, whether infant, dominant female or adolescent male is a participant and is familiar with every other animal in the group. Though the emotional connections between individuals formed in play or in grooming may be considered variations on more imperative (i.e. more deeply canalized) emotional systems that bind animals together, there is little doubt that they too contribute to the group's coherence and identity and thus to the learning of the young.

Status, place prerogative. Coexistant with, and to a certain extent conflicting with, the emotions that bind group members together and motivate them to seek and provide security and stability, are the emotions that urge individuals to define their status or place in the group and protect their individual prerogatives. These emotions are most obvious in primate males, but within the matrifocal dimension of social experience females are also engaged in determining status and are quite capable of protecting their prerogatives.

The emotions associated with dominance and aggression, with the protection of infants by females against members of the same group, and with aggressive play in the young are certainly connected with fear, apprehension, etc. But as we have seen these activities are mitigated by emotional systems that draw animals together. Thus, though these more aggressive emotional systems tend to drive indivi-

duals apart, they are actualized in a complex environment of large-scale biological and social imperatives within which there is a certain amount of flexibility.

It is hard to know what the chimpanzee Mike was feeling as he watched the dominant males grooming one another, but van Lawick-Goodall makes it clear that this was an intensely emotional moment for him. What is interesting is that he didn't have to actually fight the other males in his drive to define his personal status in the group. The commotion he made with the kerosene cans was enough to establish a kind of individuality which (perhaps in complex ways) became translated into status. It is equally hard to know what the dominant males felt as Mike made his charge with the cans. Surely they were afraid, but it is likely that this was not the same sort of fear they would have felt at the approach of a leopard.

The intricacies of dominance and status relationships among primates of different species are little known, but if the intricacies are not known it is probably safe to say that every animal in a primate group is engaged to some extent in the determination, that is to say the learning, of individual place in relationship to other animals. That this is neither a consistent nor a linear determination is clear from the variety of behaviors exhibited by dominant animals toward other animals in the group. Mountain gorilla silverbacks and chimpanzees are remarkably tolerant of infants, but less tolerant of juveniles. Van Lawick-Goodall noted that once the kerosene can banging Mike had secured his position as dominant male of the chimpanzee

troop he frequently shared meat with other animals.

Much of the early learning of place and prerogative is done in the play group in which the young try out adult behaviors oriented to the determination of status. While it is difficult to assess the ways in which this aggressive play is mediated by emotional responses, there is no doubt that play is an activity that is highly charged with feelings.

The emotions of learning. We have seen that the young of all primate groups appear to be motivated internally to seek experience in their world. They establish contact with the environment early on through observation and later, through investigative behavior and play, explore the physical and social worlds available to them. The Baldwins suggest that novelty itself provides a satisfying reinforcement that urges the young on to further exploration and manipulation of the environment, and Harlow and Mears (1979) provide ample evidence of the persistence of curiosity displayed by all young primates. It seems that the learning activities of observation, imitation, exploration and, above all, play, are pleasurable for young primates. This is a key evolutionary process, for the pleasurable activities of play, etc. help the young primate learn what is necessary to survive and thrive in both the physical and social environments.

Young primates are learning as they grow and mature how to be members of the group they are a part of. Being a member of the group implies sexuality, protection and care of the young, involvement in

status structures, and many more intricate relationships that are set in the context of reproduction, dominance, and the matrifocal unit. The various activities of learning -- observation, exploration, and play -- have developed as integral elements of this process. Youngsters are bound to the group through innate emotional responses and through the activities they engage in as they mature. What is learned and the ways in which it is learned are not separable in primate societies, for the time and energy spent in play and exploration result in group-living adults who competently fulfill the roles that contribute to the survival and well-being of the group and to their individual status and well-being as well. Indeed, young primates "learn effortlessly" how to function in the physical environment and in their societies at least in part because such learning is mediated by emotional systems that ensure a secure environment for the activities of learning, help create the social context in which these activities take place, and reward these learning activities directly.

CHAPTER III

THE HUMAN ADAPTATION

Sometime during the Pliocene, between four and five million years ago, new primates began to emerge in East Africa. These were ground-dwelling animals, and from the fossil evidence of their pelvic, knee and foot structures it is known that they walked upright (Johanson and Edey, 1981). Although there is considerable debate as to how many species of hominid existed between five and one million years ago in Africa* there is evidence that by two million years ago these hominids (probably early representatives of Homo) were using stone tools to butcher large animals and were transporting tool materials and prey animals to home bases (Isaac, 1978 [1979]; Bunn, 1981). At least some of these bipedal creatures were the ancestors of modern humans, and as they evolved they developed, from the primate axes of sociality, distinctly human social adaptations common to our species.

The difficulties involved in identifying the antiquity of particular elements of the human adaptation have been noted in Chapter I, and a considerable amount of theoretical modeling is

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*The major disagreement today is between the Leakeys (e.g. R. Leakey and R. Lewin, 1977) and Donald Johanson (D. Johanson and M. Edey, 1981). The Leakeys believe that there were two species of Australopithecus (A. africanus and A. robustus) and that Homo did not rise from the Australopithecine line but diverged from a common ancestor at about the same time. Johanson, on the other hand, makes a good case for a third and earlier species, A. afarensis, from which both later Australopithecines and Homo emerged.

unavoidable in this area. The fossil remains and stone artifacts of Homo habilis will not tell us directly how the young of our hominid and early human ancestors learned or what they had to learn in any detail. Nevertheless, enough evidence exists to make some good guesses about the general social framework and lifestyle of our progenitors, particularly when this evidence is located in the intersection of the primate axes of sociality and the known social relations of contemporary nomadic foraging societies (Dahlberg, 1981; Tanner, 1981). And if we know something about the way these hominids lived and were organized socially we will be able to know something about the learning of the young, for it is safe to assume that becoming competent in social relations as a member of a group was at least as important a function of learning for young group-living hominids as it is for contemporary social primates.

The first section of this chapter examines the archaeological evidence for hominids that lived from 4,000,000 to 1,000,000 years ago and speculates as to the changes that took place in the old primate axes of sociality that are implied by this evidence. Particular attention is paid to the feedback relationship between the development of increasingly complex social relations and the evolution of the human brain.

The second section of this chapter locates these probable human adaptations in the context of life in contemporary nomadic foraging societies. The learning of children in these societies is reviewed in terms of the three socio-emotional systems identified

in the previous chapter, for, like the social primates described in Chapter II, gatherers and hunters (1) are tied to one another in many ways and have strong feelings about their attachment to others, (2) are at the same time motivated to seek status and individual identity in the context of the group, and (3) learn effortlessly, largely through the activities of observation, play, and investigation. In this context we may be able to understand something of the purposes and activities of learning among our Pleistocene ancestors and thus begin to sketch in some characteristics of the human learning adaptation.

What is Human?

Bipedalism, as the oldest certain characteristic of hominids based on archaeological evidence, provided the framework for the interpretation of data and the development of models of "humanization" for many years. In the early 1960's Washburn proposed that with bipedalism came a series of developments that reinforced one another and contributed to the rapid (in terms of geological time) evolution of human sociality and the human brain. According to Washburn bipedalism gave primates a freedom of activity for the hands that had not existed before. The freeing of the hands enabled these new primates to carry food and the young from place to place with greater ease and substantially increased the animals' range (e.g. Washburn, 1960 [1979]; Washburn and Devore, 1961b). At the

same time a bipedal posture severely restricted the size of the birth canal and forced the birth of the young at increasingly early stages of development, which made them dependent for longer periods of time. This period of protracted infancy made it possible for the offspring of bipedal primates to remain in the role of learner (see Chapter 2) for a greater period of time (Washburn, 1960[1979]). The freeing of the hands also led to increased competence in the use and manufacture of tools, and tool use and manufacture has been considered a "prime mover" in human evolution.

> Complex and technical society evolved from the sporadic tool-using of an ape, through the simple pebble tools of the man-ape and the complex toolmaking traditions of ancient men to the hugely complicated culture of modern man. Each behavioral stage was both the cause and effect of biological change in bones and brain (Washburn, 1960 [1979]: 21).

According to this line of reasoning, an outgrowth of tool use and increasingly sophisticated technology was the development of large game hunting as an important subsistence technique. Hunting has itself been viewed as a prime mover of human evolution.

> ...the master behavior pattern of the human species. It is the organizing activity which integrated the morphological, physiological, genetic, and intellectual aspects of the individual human organisms and of the population who compose our single species. Hunting is a way of life, not simply a "subsistence technique" which importantly involves commitments, correlates, and consequences spanning the entire biobehavioral continuum of

> the individual and of the entire species of which he is a member (Laughlin, 1968: 304).

It has even been hypothesized that through big game hunting, and the cooperation and organization it implies, human language developed (Hewes, 1973).

Until recently the evolution of human beings from bipedal primates was viewed traditionally in terms of this more or less direct progression from bipedalism to tool use and hunting, to a sexual division of labor, complex social organization and language. However, more recent thought tends to discredit bipedalism as the prime mover of humanization (and, indeed, the notion of prime movers in general). For example, there seems to be a rather long hiatus between the appearance of fully bipedal primates and the appearance of the enlarged cranium associated with early humans. (Johanson, 1981). Even the existence of tools does not guarantee what we would call "humanness." Wynn (1981) applies a Piagetian framework to the interpretation of Oldowan stone tools (1.7 million years ago) and suggests that

> the evolution of a uniquely hominid intelligence had not occurred by Oldowan times. However, the basic hominid morphology of upright posture had been achieved by 3.5 million years ago. This suggests that selection for a complex organizing intelligence was not part of the original hominid adaptation. For several million years hominids did not rely on some special cleverness not possessed by other hominoids. The adaptation may have involved diet or locomotion or some other behavioral and morphological complex, but selection for intelligence

> appears not to have been significant until after the Oldowan (Wynn, 1981: 539-540).

Although Wynn's assessment of hominid intelligence on the basis of Oldowan tools is highly speculative there is another problem with the bipedal-complex hypothesis as the model for human evolution. All the behaviors that have been associated with this advantage (i.e. tool use and manufacture, hunting, prodding and "gathering" with tools, the carrying of food and the young, etc.) have been observed in contemporary higher primates, as noted in Chapter 2.

Buried in much of the controversy that has resulted from the rejection of the bipedal hypothesis and the attendant proliferation of humanization models (e.g. Tanner, 1981; Lovejoy, 1981; Blumenburg, in press) is the question of what makes a hominid a human. All agree that there are qualitative differences between what humans do and what other primates do, but if these differences are not represented by bipedalism in the fossil record, or by tool use and manufacture per se, what are the qualitative differences? Even with a time machine, evolution being what it is, we would never be able to witness the moment when our ancestors "crossed the line" from hominid to human, but it is important to get a sense of some of the characteristics that many agree are uniquely human and when they may have appeared in the human line.

One of the most significant developments in the emergence

of humans was the remarkable increase in brain size and complexity of function from Australopithecus (or early Homo) to Homo erectus, who appeared about 1,000,000 years ago. There are a variety of explanations for this dramatic development. For example, several prime mover theories have been advanced. Falk (1980) examines five of these proposed catalysts (i.e. warfare, language, tools and labor, hunting, and heat stress) and concludes that there is no evidence to justify the identification of any single variable that contributed more than other variables to the development of the advanced hominid brain.

The emergence of the human brain is, indeed, located in a matrix of social and biological developments. Tool manufacture, for example, improves dramatically within the relatively short period of time of the brain's development, and there is evidence (see below) that early humans lived in cooperative social groups that utilized a home base. Lovejoy (1981) locates the origin of these social characteristics in a distant hominid past and asserts that the emergence of bipedalism was related to the development of bonds between males and females which encouraged the males to hunt or gather food and bring it back to females who remained with their young near a home base.

> ...both advanced material culture and the Pleistocene acceleration in brain development are sequelae to an already established hominid character system, which included intensified parenting and social relationships, monagamous pair bonding, specialized sexual-reproductive

> behavior, and bipedality. It implies that the nuclear family and human sexual behavior may have their ultimate origin long before the dawn of the Pleistocene (Lovejoy, 1981: 348).

Although many disagree with the time frame proposed by Lovejoy, his association of bipedality with home bases and the sexual division of labor, and, particularly, with his identification of males as the primary foragers in the hominid past (e.g. Tanner, 1981; Zihlman, 1981), most paleontologists would agree that whenever they occurred the complex social relationships Lovejoy describes are distinctly human and represent significant departures from earlier primate social behavior. Blumenburg (in press) does not believe that these social adaptations caused the development of the advanced hominid brain but asserts that once certain fundamental genetic mutations that affected the brain occurred they were subject to selection pressures from the complex of activities already present in hominid societies. No doubt after the mutation or series of mutations postulated by Blumenburg the bipedal social hominids living on the East African savannahs were profoundly affected by the feedback relationship between brain capacity and complexity and social complexity. The young of these early humans were capable of learning more and more -- and there was more and more for them to learn.

> We saw during the last 2.3 million years of hominid evolution almost a tripling in brain size, most of which

> can be attributed to the massive growth of the neocortex. This growth, however, was not equivalent in all regions of the brain; rather it was disproportionately greater in the regions which mediate the psychological functions identified as "social competency" (Fishbein, 1979: 207-208).

The Food-Sharing Hypothesis

As noted above, Lovejoy locates the origin of the loss of female estrus, monagamous pair bonding, the utilization of home bases and the sexual division of labor in a time frame of four to five million years ago. But there is no material evidence for this assertion, and many disagree with his model. Tanner, for example (1981) believes that the sexual division of labor, while associated with sexual selection and the bonding of males and females, is a much more recent phenomenon in human evolution and was connected with female gathering and selection of males for sociability rather than the supposed restrictions of childrearing and the male foraging proposed by Lovejoy.

Although we may never know with any certainty when the distinctly human social adaptation emerged, or how, it is important to see that it was cooperative in nature and was characterized by reciprocal arrangements. Isaac (1978) proposes a model for such arrangements based on evidence from several sites around Koobi Fora (East Africa) and maintains that the size and quantity of the animal remains at these sites found in conjunction with hominid

bones and tools (earliest site: 1.7 million years ago) indicate that the hominids who lived at that time had a diet that contained considerably more meat than is common in the diet of other primates. In addition, cutmarks on the Koobi Fora animal bones (Bunn, 1981) indicate that the hominids that camped at these sites used tools to butcher the animals they ate--animals as large as a hippopatamus. Although Isaac thinks it unlikely that hominids hunted animals as large as hippopotami, he offers evidence from other sites which suggests that "the earliest meat-eaters might have obtained the flesh of animals weighing up to 30 kilograms by deliberate hunting" (1978: 122).* There are so many animal remains at some of these sites that the only possible conclusion, according to Isaac, is that prey animals were carried to the site by the hominids for consumption there. According to Isaac these data suggest that (1) proto-human hominids utilized a home base at least as early as 1.7 million years ago, and (2) it is likely that, in the context of meat-eating (and perhaps hunting) and the utilization of home bases, a division of labor in hominid subsistence patterns had emerged by this time.

Zihlman (1981) disputes this conclusion and insists that evidence

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*In an exhaustive examination of the data for hominid hunting, Binford (1983) concludes that there is no certain evidence that hominids hunted at all before the appearance of Homo erectus. However, in view of the data on chimpanzee and baboon hunting (see Chapter II) and the high concentration of animal remains in some sites investigated by Isaac it seems unlikely that early humans did no hunting whatsoever.

of increased meat consumption, the transport of food and tools from one location to another, and the utilization of home bases does not prove the existence of a division of labor by sex -- at least not in the modern human sense. She emphasizes the "male bias" of not only the interpreters of archaeological data but of the archaeological data itself and proposes a model of humanization which, like Tanner's, emphasizes the importance of female gathering in the development of human beings. Digging sticks or slings for carrying food or children have not survived in the fossil record, after all, and there is certainly no way to tell from a stone tool whether its user was male or female.

This is undeniably true, but in a sense this line of reasoning obscures the most important point about becoming human. What is significant about the division of labor and the utilization of home bases is the cooperative relationship implied, not the specific identifications of males with hunting or females with gathering (or either of these food-getting processes as prime movers in human evolution). The association of a home base with a sexual division of labor is probably more significant in terms of the safe environment provided for dependent young than it is in terms of gender-specific subsistence tasks. Indeed, the Griffins (1981) have shown that while Agta women hunt quite capably, the society maintains a division of labor which is grounded not in subsistence but in child care.

Isaac himself is aware of the male bias of the fossil evidence

and attempts to build a model of human evolution in which the elements of hunting, gathering, the division of labor, and the utilization of home bases interact in a feedback relationship with the use of equipment and tools and the sharing of food.

> If we compare the food-sharing explanation with ... alternative explanations we see that in fact food-sharing incorporates many aspects of each of the others. It will also be seen that in the food-sharing model the isolated elements are treated as being integral parts of a complex, flexible system (1978: 123).

The key words here, especially for an investigation of the human learning adaptation, are "sharing," "complex," and "flexible." The hominids of 2,000,000 years ago were apparently already living in groups that utilized home bases, they carried tools and tool materials from one place to another and, possibly, they had divided subsistence and childrearing tasks in ways that made the group as a whole more efficient and cohesive. These were significant elements of the social environment in which the young grew and learned, and the complexity generated by such social relationships required increasingly more learning. It is probable that the principles of reciprocity, attachment, and gender identity in the acquisition of particular skills and knowledge have been central to human learning for at least 2,000,000 years.

New Social Relationships

How did the changes that marked the emergence of humans affect the axes of sociality that no doubt existed in pre-hominid primate groups in East Africa? If we may assume that dominance, matrifocality, rudimentary specializations of activity by sex (including tool use and predatory behavior), and a significant focus on the young) characterized the primates of East Africa before the development of the hominids, what might have happened to these dimensions of sociality as non-human primates evolved into hominids and hominids evolved into humans?

Dominance and dominance hierarchies. It is likely that the character of dominance began to change towards less emphasis on rigid hierarchy with the evolution of distinctly hominid characteristics. The fundamental component of this "contextualization" of dominance was the attachment of the male to a mother and her offspring to form the human family as the primary unit of social life. In some imprecise period of time during the Pleistocene (or, if Lovejoy is right, the Pliocene) a veritable cascade of inter-connected characteristics associated with this unique primate adaptation evolved. The sexual division of labor, food sharing, mutual reciprocity, the loss of female estrus -- all imply the gradual development of a kind of partnership between adult males and females that extanded beyond the urgencies of reproduction

(Lancaster, 1975).

One of the most profound effects of the evolution of the human family on the learning of the young was no doubt a reordering and complication of the attention structure within the group. As noted in the previous chapter, the dominant males in all primate societies are major foci for the attention of other animals in the group. But in a society that consisted of a number of family units the attention of the young would tend to be focused not on single males, dominant in the group, but on fathers and mothers in the family unit or even on a wider array of adults in the society (e.g. Turnbull, 1961). One implication of this shift in the focus of the attention structure of the group, given the characteristics of information flow postulated for the Japanese macaque society described in Chapter 2 is that a more flexible, more responsive attention structure evolved in which animals paid attention to and were interested in the behavior of an increasingly wider range of individuals.

Male-female relations and roles. In some ways the most dramatic changes in the social interactions of the rapidly evolving hominds that lived from 2,000,000 to 1,000,000 years ago took place in the context of male-female relations. The loss of female estrus suggests that what might have been earlier primate tendencies towards pair bonding and specialization of areas of activity (see Goodall, 1971) were extended into a totally new system of

social organization. For the first time in primate history deep and reciprocal bonds developed between adult males and females, and the loss of estrus has been interpreted as evidence for selection for this bonding (e.g. Ullock and Wagner, 1980; van den Berghe, 1979, 1980). In this interpretation sex became such an important component of the bond that females with longer and/or more frequent periods of sexual receptivity and males who were more sociable with females during and beyond these periods of receptivity (Tanner, 1981; Zihlman, 1981) were more successful reproducing than animals without these traits. The overwhelming drives surrounding reproduction in other primates (absent when females are not in estrus) became generalized human behavior, contributing not only to the survival of the species but to the binding of individuals together as husband/father-wife/mother.

The sexual division of labor that evolved in the context of the bonds between males and females formed a subsistence strategy new to primates and engendered increasingly elaborate systems of reciprocity. We have seen that in some ways there are role specializations of males and females in every catarrhine society and that in some (notably the chimpanzee) there is definite specialization of activity with regard to subsistence. But perhaps as many as 2,000,000 years ago this role specialization became the central theme of hominid subsistence.

Certainly the complexities of the development of the human division of labor will forever be unknown, but it is reasonable to

suggest that in the course of its development some kind of relationship evolved between the extension and refinement of the specializations of roles identified with gender and increased opportunity for sharing, cooperation and reciprocity. It is most likely in this way that the separation of roles by sex in hominid societies -- which may appear to run counter to the great integrating processes that brought about the development of the human family -- actually brought animals closer together and thus contributed to the emergence of the family as a social as well as a subsistence unit.

The young. With the appearance of the family structure among early humans the importance of the young in the society probably acquired new dimensions. Reciprocal attachments were formed between fathers and their offspring, attachments which may have contributed, in turn, to the enhanced survival of the young insofar as they increased their access to food and extended the security within which the young could learn. It is likely that in the context of these attachments the young became shared foci of attention for males and females, and this shared focus contributed to the bonds between husband and wife. In addition, increased focus of attention on the young may have enabled early human groups to gradually become more receptive towards (that is, "aware of" in terms of the attention structure) useful innovations pioneered by the young in play and exploration.

No doubt the learner role of the young, a common feature of all

primate societies, became increasingly important, even crucial, to the survival and well being of the young in these early human societies. As mentioned above, these infants were born at increasingly early stages of development and were thus more vulnerable for a longer period of time than the young of pre-hominid primates had been. It is likely that the family structure provided the greater security needed for these neonates to mature properly,* provided the attention structure through which the young learned, and also provided models of increasingly complex behavior, skill, and interaction to be learned.

But if the social environment for learning changed, there is no reason to believe that this learning took place in activities other than those engaged in by other primate young. Indeed, it is reasonable to suggest that these activities of primate learning -- observation, imitation, exploration, play -- were intensified in the course of hominid evolution, for they could be engaged in for increasingly longer stretches of immaturity and were stimulated by an increasingly complex variety of social interactions represented by the sexual division of labor, sharing tool and equipment manufacture and use, and reciprocal obligation. With the evolution of language and complex linguistic and material cultures the early human societies no doubt became more efficient at sur-

*For example, with the extension of the male focus on offspring that must have evolved as the family unit evolved came the male's protection of his own offspring -- something done only by females in other primate groups.

vival through the great advantage of more sophisticated communication systems. In addition, language and culture further reinforced the bonds among group members and, at some point, enabled the emergence of the idea of the group (see Chapter 5). No doubt the young of Homo erectus 500,000 years ago "learned effortlessly" how to become competent members of the group they were part of in the environment they lived in; however, by this time the complexity of the human learning process, if not the effort of it, was astounding.

Learning in Contemporary Foraging Societies

It is possible to make speculations about life in Pleistocene foraging societies because the gathering and hunting way of life has persisted into modern times in many parts of the world. Perhaps the most striking characteristic of life in nomadic foraging societies (at least for observers from modern technological societies) it what might be called its "wholeness," its fully integrated nature.

Every activity, from tool manufacture to healing, is connected with every other activity. Life in a foraging society is a great circle of relationships in a dynamic equilibrium with the physical environment, and wherever the student enters this circle, balances, obligations, connections, expectations and symbols stretch around in either direction. It is probable that early human so-

cieties existed in this same state of integration, and although contemporary gatherers and hunters are no doubt very different from Pleistocene early humans, the kinds of relationships that are necessary for survival and social well being in such societies are likely to be similar, as Shostak (1981) indicates, no matter what time period they exist in.

One important characteristic of the hunting and gathering way of life is that it exists in an intimate and immediate connection with the natural environment for all life processes. All food, all clothing, all tools, all shelter are drawn from materials that are available in the local environment. Changes in the seasons, the weather, in the patterns of animal migration or water availability intimately affect the life of a foraging group, and the movements and cycles of the Australian aboriginies, the !Kung, the Eskimo or the Mbuti Pygmies are inextricably woven into the cycles of the desert, the arctic, the rainforest.

In every environment in which gathering and hunting societies exist, a stable pattern of relationship between the size of the subsistence group and availability of resources has developed, and although there is a considerable amount of variation in the size of any particular group at any particular time, an upper limit on the size of the group is imposed by the physical environment.

In nomadic foraging societies, the basic cooperative and co-residential unit is the band (Damas, 1969; Lee and Devore,

1968). Bands typically consist of groups of 25 to 50 people made up of related families that live and travel together. There is some evidence that the average size of subsistence groups in paleolithic times fell within this range as well (e.g. Birdsell, 1968). But it is important to note that the "average range" of 25 to 50 members of a band in no way implies a static band population. The size of these subsistence groups fluctuates constantly. There is, in all foraging societies, a pattern of coming together and breaking apart that is intimately connected with the cycles of the physical environment and the availability of resources. The !Kung break into average sized bands throughout the wet season and come together gradually into substantially larger groups around major water holes during the dry months (Lee and Devore, 1976; Lee, 1979). The Netsilik Eskimo form caribou-hunting and salmon-fishing groups of 25 to 50 individuals for most of the year then come together in groups that may number 150 or more for breathing-hole sealing in the deep winter (Balikci, 1970).

But the fluctuations of the physical environment are intertwined with social and cultural needs in the lives of hunter-gatherers. For one group of Mbuti -- those who hunt primarily with bow and arrow -- the honey season in the rainforest is a time of coming together; while for the Mbuti who hunt with nets the honey season is an occasion for the fragmentation of groups that have been together for much of the year (Turnbull, 1968). Differing "meanings" for the same environmental fluctuation indicate that

these movements apart and together are important social as well as subsistence activities. When the smaller groups come together around a waterhole or on a winter ice floe, old relationships are renewed and new ones are begun. Marriages are contracted and relatives are revisited. It is a time for celebration and healing. These social activities have developed as they have in association with the physical environment, but the Mbuti example suggests that the relationship between environmental fluctuation and patterns of fission and concentration is not a linear one. Activities of tremendous importance to the people of these groups have developed in consort with variations in the external environment, not strictly because of them.

Another consequence of living in a direct connection with the physical environment for all life processes and materials is that there is no question about the value of one's activity. Making an arrow, digging out a root, telling a story, etc. -- all have an "absolute meaning" because they are intimately connected with individual and group survival and well being. This dimension of life in a gathering and hunting band is hard for people from a modern technological society to grapple with; we are separated in many ways from the physical environment. But it forms the "background," so to speak, of all learning in nomadic foraging societies and no doubt formed the same background in human societies from their emergence in the Pleistocene.

The Social Context of Learning: Attachment and Belonging

The family, the band, and kinship. At the center of any foraging band is the family. Polygyny is common to all hunting and gathering societies -- though its frequency is generally low and its importance in a particular society is connected with both environmental and cultural variables. The most common unit in a gathering and hunting society is the nuclear family that shares a shelter. This group usually consists of a couple and their small children.

From the moment of birth, infants in gathering and hunting societies spend almost all their time in direct physical contact with their mothers. Whether babies are carried in the amaut of the Inuit or the kaross of the !Kung, they ride in warmth and safety, always close to the breast. Even toddlers are frequently carried by their mothers until they are weaned to make way for a new sibling, and this intense and long-term contact engenders deep and lasting bonds between mothers and their children, both male and female. So strong is this bond that weaning is usually a most difficult time for children in nomadic foraging societies (Shostak, 1981; Briggs, 1970; Goodale, 1971). The bonds between mothers and their children have an important effect on the visiting patterns of people in foraging bands, and mothers may wield a considerable amount of influence over both sons and daughters -- even into adulthood (Goodale, 1971--see below).

The mothers in all foraging societies have the primary responsibility for infant and young child care and early socialization, but the fathers take great interest in the welfare of their children and spend a lot of time playing with them -- especially when they are very young.

> !Kung fathers -- indulgent, affectionate, and devoted -- also form very intense mutual attachments with their children... Fathers, like mothers, are not viewed as figures of awesome authority, and their relationships with their children are intimate, nurturant, and physically close (Shostak, 1981: 45).

In all nomadic foraging societies the bonds between children of both sexes and their fathers are strong and deep (Briggs, 1970; Turnbull, 1961; Meggitt, 1962; Schebesta, 1927). Nevertheless, at a certain age range, somewhat different in every society, young girls begin to spend less time with their fathers than they do with their mothers and, conversely, young boys begin to spend more time with their fathers.

> Until his young son or daughter reached the age of five or six, the behavior of a father was identical toward them. When a newborn infant was in the mother's amautaq [carrying sling] the father played fondly with it, holding its arms and caressing its cheeks while gently talking and teasing the infant with the hope of provoking a smile. Sometimes the father would hold the baby himself. After the age of three or four body contact gradually diminished, while the playful relationship involving slight teasing continued. The father made some of the toys his children played with, such as

> ice toys or spinning toys of bone.
>
> After the age of four or five the father-son relationship grew more intense. The boy watched his father at work, patiently and silently, observing each gesture (Balikci, 1970: 104-105).

The attachments formed by children to their parents last a lifetime. Daughters often express a longing to be with their mothers (e.g. Meggitt, 1962), sons and daughters provide for elderly parents that are unable to hunt or gather for themselves (e.g. Turnbull, 1961), and a young married couple may reside for a time with the wife's parents' band in order to ease the separation (Meggitt, 1962). Often attachments are then formed between the son-in-law and father of the bride and her other male kin, and the couple continues to reside in the wife's band long after the "bride price" has been paid (Lee, 1979).

The band is made up of several of these smaller family units that camp, hunt, and gather together. But the entire band -- and many individuals in other bands -- are "family" in a real way. Almost all social relationships in foraging societies are founded upon blood or marriage ties, and where these ties do not exist kin-like ties are created (see below). Thus a fundamental characteristic of the environment for learning in gathering and hunting societies is that children are always among their relations. In this regard it is interesting to note that most foraging groups call themselves simply "The People."

This closeness, this deep current of relationship and connection with virtually every person in the world of the society and the physical proximity to them on a day-to-day basis describes an interdependence that is difficult for people in a modern industrial society to grasp. Among the Mardudjara aboriginies of the Western Australia desert

> [Kinship] gives people a strong sense of security and well being that stems from their envelopment within a universe of kin, with all of whom some feeling of mutual obligation and responsibility ideally exists... I have never heard Mardudjara express resentment or frustration at the restrictions that their kinship system places on them. Instead, people talk with satisfaction about the good feelings that come from being surrounded by so many others who are "one family" and "one people" with them (Tonkinson, 1978: 45).

Kin relations, closeness,and the security they bring are fundamental to learning in gathering and hunting societies, but it is important to see this context of closeness not so much as a rigid dimension of social control (as it is often conceived to be in Western society) but as an all-pervading dimension which, like the relationship gathering and hunting peoples have with the external environment, provides a framework for social life.

> ...the !Kung are dependent for their living on belonging to a band. They must belong; they can live no other way. They are also extremely dependent emotionally on the sense of belonging and companionship. Separation and lonliness are unendurable to them. I believe their wanting to belong and be near is actually visible in the way families cluster together in an encampment and in the

> way they sit huddled together, often touching someone, shoulder against shoulder, ankle across ankle. Security and comfort for them lie in their belonging to their group, free from the threat of rejection and hostility (Marshall, 1976: 350).

Since everyone within an ill-defined perimeter is one of The People, it is possible for any individual to feel comfortable and, in fact, belong in several different bands, and although there is usually a stable core of individuals that characterize a particular band, there is a great deal of shifting in the population of particular bands in the course of a year. It is, for example, not uncommon for a dispute between individuals or families in a band to be resolved by a separation of the parties involved (see below). At the same time there is a great deal of visiting among kin in different bands, and the composition of a foraging band changes from month to month. It is important to note that this movement from one group to another and one set of intimate associations to others equally or almost equally intimate is an expected and normal aspect of social interaction.

The implications for the socialization of children in this context of closeness are profound. In the sense that all the individuals in the group are related through either blood or marriage all the adults in the group are, to some extent, mothers and fathers, grandmothers, grandfathers, brothers and sisters. Among the Mbuti

> a sleepy midday camp can become filled in a minute with shouts and yells and tearful protestations as a baby, crawling around this warm, friendly world, gets into a bed of hot ashes, or a column of army ants. In a moment he will be surrounded by angry adults and given a sound slapping, then carried unceremoniously back to the safety of a hut. It does not matter much which hut, because as far as the child is concerned all adults are his parents or grandparents... He knows his real mother and father, of course, and has a special affection for them and they for him, but from an early age he learns that he is the child of them all, for they are all children of the forest (Turnbull, 1961: 127-128).

A further implication for the learning of the young described by Tonkinson will be investigated at length below, but it deserves mention here.

> The Mardudjara, realistically, do not expect children, especially small ones, to conform to the kinship system. Children's lives in the desert are remarkably free from restraints and very little pressure is put on them in their socialization. But they are born into a world of kinship statuses; they hear kind terms in constant use; and as soon as they are considered capable of assimilating knowledge, they are taught the should and should-nots of behavior towards various kin. They see the system in action and thus learn both the ideal and actual patterning of social relationships as part of growing up . They absorb the system effortlessly, learning the primacy of kin category as a behavioral guide... Having learned the system, children begin conforming to it in early adolescence without any specific directives from their elders (Tonkinson, 1978: 45).

Children and the context of closeness. One of the more striking similarities among all gathering and hunting societies is that they are all what Tonkinson (1978) calls "child centered." In every foraging society the children provide "the emotional focus of the

household" (Helm, 1961) but are often expected to provide little or nothing in the way of food-getting or even help for parents or other adults until well into adolescence. Among the !Kung, the Australian aboriginies, the Mbuti, the Malaya Semang, and others, males are not expected to begin hunting on a regular basis and producing consistently until they are married and have begun their own families. This is not to say that adolescent males never hunt or do not contribute to the welfare of the group, but only that they are not expected to do so by the adult members of the band. Females in these societies begin their productive lives earlier inasmuch as they are generally quite a bit younger than males at marriage.

The coming of children, even more than marriage, signifies full adulthood in nomadic foraging societies (e.g. Shostak, 1981; Helm, 1961), and this is true whether or not there are specific ceremonies in the culture to mark the arrival of an individual boy or girl at a particular age or state.

> the marital bond was of course further strengthened by the presence of offspring. Like all other Eskimo tribes, the Netsilik were extremely devoted to their children. Family life or better, adulthood, acquired a deeper meaning only in reference to procreation (Balikci, 1970: 104).

In all gathering and hunting societies the adults are described by ethnographers as "indulgent" with children. Children

always "get their way." Meggitt says of the Walbiri of Central Australia:

> Until they are initiated, boys are indulged by their fathers to an extent rarely observed in our own society. Only on two occasions did I see a man strike a young son (Meggitt, 1962: 116).

The central position of children in all foraging societies is, as with all other characteristics of the foraging way of life, inextricably connected with the closeness of all the people in the society to one another and with the direct connection to the external environment. In an evolutionary sense, the children born to an extended family represent that family's "wealth." Thus, although the children do not usually become responsible for the food-getting of the society until well after they have the physical capacity to do so, they are of central importance in the society and serve to unite other members of the group.

> In sum, the presence of children, whether natural or adopted, united parents closely and further strengthened the marital bond. The children were never separated from their parents for any length of time. They grew up in close association with the adult world, free to observe and imitate their parents. They became conscious of the respective roles of each parent early, as adult activities were easily visible and there was nothing hidden in the igloo (Balikci, 1971: 108).

Similarily, Briggs notes the importance of a little girl in an

Utku Eskimo family. "Indeed, in some respects Saarak was more important than her father. She was the lodestone not only of her household but of her whole kin group" (Briggs, 1970: 107-108).

A related role of children in gathering and hunting societies is what Helm calls "agents of informal social control." Because children in these societies are generally unrestrained and rarely coerced or disciplined, they usually feel free to spread gossip and tell tales without regard for the possible consequences. The children's power

> stems from the fact that they are, par excellence, seekers and disseminators of information in general and of titillating gossip in particular, and the possibility of being gossiped about is, for a Slavey, often an effective inhibitory sanction. Of all members of the community, the children circulate most actively and freely and therefore are often among the first to pick up any sort of news. They are quick to communicate to one another and to adults, friends and parents. They do not exercise the caution toward gossip or expression of opinion that the adults do; indeed, they are avid to pass it on (Helm, 1961: 112).

Not only are the children in nomadic foraging societies brought into a social environment that is characterized by intense family and kinship ties that create a pervading context of closeness, they contribute, by their very presence, to that closeness and to the identity of the group. They are not superfluous to social relations but significant and active social operators. Husbands and wives are bound more closely through

their children,* and entire kin groups may be more closely united in their interest in and concern for the children that are born to them.

Other ties that bind. The development of reciprocal obligation and food sharing marked an important event in human evolution. Cooperation enabled humans to seek larger and larger prey, and regularized patterns of sharing and reciprocity guaranteed that all in the group would eat whenever food was available to any. Cooperation between males and females insured excellent infant care while different kinds of food were being procured and enabled the family group to accomplish more than one thing at a time. These qualities helped to make the early human of 2,000,000 to 1,000,000 years ago a most efficient and flexible creature.

The reciprocal obligations that derive from the sexual division of labor in gathering and hunting societies are vital to the survival of not only the core family but the group as a whole. In all of these societies the balances between the efforts of males and females are crucial, but these balances are rarely one-to-one. For example, in all but the foraging societies of the far north where plant food is of no consequence in subsistence, gathered food accounts for 60% - 80% of the average daily diet (Lee and Devore, 1968; Lee, 1979). However, the people of these societies

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*Among the !Kung "there are few divorces after the birth of the first child" (Shostak, 1981: 182).

seem to be fonder of meat than of vegetable foods. The !Kung speak of being "meat hungry" when the hunting has been bad, no matter what vegetable foods may be available (Shostak, 1981). Meat is shared among the whole group while plant foods are usually eaten by only the immediate family. The women have the greater responsibility for child care, the men often have greater responsibility for the ceremonial life of the band. Even among the Eskimos and Athapaskan and Algonkian Indians of the Canadian north, where women do not contribute to the food supply through gathering (although they are often engaged in certain aspects of hunting or fishing) reciprocal balances have developed. Women in Eskimo societies sew all the clothing and cook all the food. In addition they, like women in all gathering and hunting societies, have primary responsibility for child care. Men in Eskimo societies hunt and, like the men of many other nomadic foraging societies have primary responsibility for ceremonial activities.

In a later section we will explore the subtleties of balance in the sexual division of labor in hunter-gatherer societies, but the point to be made here is that the relations of reciprocity between husband and wife lie at the heart of any foraging band's subsistence success. Marriage is a relationship of economic interdependence as well as reproductive necessity or social convention. If a couple find that they can't get along they usually separate -- especially if there are no children. Divorce, particularly in first marriages, is rather common in these societies (e.g.

Shostak, 1981; Evans, 1937) and even if kin urge couples to stay together, separations based on irreconcilable differences are not condemned. Meggitt writes of the Walbiri:

> In this society the sexual division of labour is clearly marked. The men hunt game, the women gather vegetable foods and the smaller forms of wild life. The women also prepare most of the food, collect firewood, carry water, and care for the young children. The people assert that, in repsect of these activities, each spouse has a claim on the other's services, both on his (or her) own behalf and on behalf of their children. If either fails to honour the obligation, the other is entitled to penalize the offender (Meggitt, 1962: 92).

Reciprocity is, of course, extended to all kin relations in foraging societies. Although the particular kinds of helping and sharing that are expected among kin vary from group to group, each gathering and hunting society has developed these reciprocal relationships to an elaborate degree. Among the Australians, particular kin have special duties during initiation ceremonies, and it is expected that these offices will be reciprocated at a future time (Meggitt, 1962; Tonkinson, 1978). In all foraging societies the meat of large animals is distributed along lines of kinship (though there are often other sharing relationships in the group as well). In addition, the alliances formed by marriage are usually managed by kin.

> ...the Gidjingali [Australian aboriginies] had a clear notion of reciprocity in marriage. I have referred to this as "niece-exchange," by which I mean that a bestowal placed the reciever under an obligation to return in kind (Hiatt, 1968: 174).

Among the Mbuti "sister-exchange" marriages are considered the best kind.

> Under this system when a boy chooses a wife he becomes obliged to find a "sister" -- actually any girl relative -- to offer in exchange to his bride's family for one of their bachelor sons. This can be quite a chore, as it may be difficult to find a "sister" who is willing to marry the youth his in-laws have in mind as a groom, and whom the groom himself will also like (Turnbull, 1961: 121).

All foraging societies have generally well defined conventions that govern the division of meat after a successful hunt. As noted above, these distribution conventions are usually related to kin connections, but there are also, as in the case of the Eskimo, meat sharing partnerships that do not follow kin lines.

> Independent of kinship ties and the obvious need to establish collaborative alignment in subsistence acquisition, Netsilik society developed numerous patterned dyadic relationship which bound individual in pairs and constituted an intricate network of reciprocal ties. ...The internal organization of the winter sealing camp is reflected by the seal-meat sharing pattern, rigidly maintained at that season.
>
> Seal-meat distribution during the dark season depended on an interlocking set of sharing partnerships involving precise and inflexible rules...
>
> Sharing partners felt closely attached to each other,

> conscious of the vital necessity in the dark winter months to live, hunt and share communally. And although the equitable distribution of the food supply among camp fellows constituted the rationale for the partnerships, these also had a social aspect evidence in the particular naming pattern which stabilized friendship alignment and strengthened social cohesion throughout the camp (Balikci, 1970: 133, 135-136).

The !Kung hunter's kill belongs to the owner of the arrow that slays the animal, regardless of who shoots it. Arrows are given as gifts -- women often own them -- and the owner of the arrow divides the meat among others.

> A hunter chooses which arrow he will use. The owner of the arrow -- who ipso facto owns the animal -- may therefore be the hunter himself, who has chosen to use an arrow he made or one that was given him, or he may be a person who lent the arrow to the hunter. ...A man asking another to accompany him might say, "Come and help me get a buck," or "Old Gau lent me an arrow and asked me to hunt for him. You come too."
>
> ...There is much giving and lending of arrows. The society seems to want to extinguish in every way possible the concept of the meat belonging to the hunter (Marshall, 1976: 359).

In this context it is interesting to note that often the successful hunter receives the least choice portion of meat (Tonkinson, 1978; Balikci, 1970), and this convention further diffuses the advantages of ownership. No matter what an individual hunter's skill, the vagaries of stalking game, the factors of luck, being in the right place at the right time, and so on, "there is an

unstated conviction that everything evens out in the long run" (Tonkinson, 1978: 37).

The cooperation ensured by husband-wife reciprocity, kinship, and meat distribution conventions is enhanced in many other ways in gathering and hunting societies. In many groups there are formalized, kin-like relationships between unrelated or distinctly related individuals, such as the joking, song, and wife-swapping relationships among the Eskimo (Briggs, 1970; Balikci, 1970; Mowat, 1951; Damas, 1969), act to further extend the social bonds of reciprocity and ensure cooperation among a wider group. In some societies these relationships may be rather formalized, while in others they are informal, but all certainly arise from the same desire to cement relations and encourage cooperation. The !Kung, for example, give gifts regularly., and according to Marshall (1976) there are only two rules for gift-giving: (1) another gift must be returned at a later date, and (2) it must be of equal value. There is no time limit for reciprocating -- indeed there seems to be a preference for "long-term reciprocity" (Tonkinson, 1978: 49) -- but everyone knows who gave what to whom when, who is responsible for what, who owes and who is owed. Stinginess is not only frowned upon socially but is brought loudly to the attention of group members when it is perceived (Marshall, 1976).

An interesting aspect of the context of closeness and cooperation in nomadic foraging societies is conversation. People seek one another out, keep up on all the latest news, talk before,

during, and after the hunt, tell jokes, tease one another; and in this way they help make it possible to remain close. The lines of communication are always open, and the openness of access permits intense closeness.

> The Mardudjara are great storytellers and love to talk about happenings seen and those unseen but heard about through the desert "grapevine"... Also characteristic are a gregariousness, a love of animated discussion and repartee, and a keen interest in what transpires in all dimensions... (Tonkinson, 1978: 127).

From the perspective of our modern, technological society in which there is so much occasion for novelty, it may seem that people living together in such intimacy would have said all there is to say to one another long ago, but the talk never flags, the stories are always interesting. Marshall's description of conversation among the !Kung may almost certainly be applied to every other nomadic foraging society.

> [Conversation] keeps up good, open communication among the members of the band; through its constantly flowing expression it is a salutary outlet for emotions; and it serves as the principal sanction in social discipline...
>
> ...The !Kung are the most loquacious people I know. Converstaion in a !Kung encampment is a constant sound like the sound of a brook, and as low and lapping, except for shrieks of laughter (Marshall, 1976: 351).

People in nomadic foraging societies are further tied together by the ceremonies that have evolved to mark the important thresholds

of life, the common perceptions of the spirit world, and the explanations for the unknown they all share. Though these ceremonies and explanations are markedly different among gathering and hunting groups in different parts of the world, these societies acknowledge the same transitions and needs. The way shamans among the Netsilik Eskimo (Balikci, 1970) heal members of the band is very different from the healing practice of the mabarn of the Mardudjara, and the healing ceremonies of these two societies are nothing like the !kia of the !Kung. But obviously these activities are all directed towards healing (that is, making whole) members of the group, and, perhpas less obviously, all draw their efficacy from the common conviction of all the people that they are efficacious. Everyone knows and acknowledges the same forces that make the healing possible.

The intense closeness, the shared assumptions, the commonly understood patterns of the external environment and of social life may be understood when one listens to a recording of a !Kung healing dance or sees photographs of the activity.

> !Kia and its setting of the !Kia dance, serves many functions. It is the !Kung's primary expression of a religious existence and a cosmological perspective. It provides healing and protection, being a magico-medical mode of coping with illnesses and misfortune. The !Kia at the dance also increases social cohesion and solidarity. It allows for individual and communal release of hostility (Katz, 1976: 286).

The lines of connection and closeness -- to the external environment

and to other members of the band -- in foraging societies are lapped and overlapped into networks that ensure the survival of all as long as food is to be had and any are able to get it. They also guarantee the opportunity for full participation of every member in the life of the group. The small size of these societies makes it relatively easy to keep track of these connections,* and the absolute meaning these connections have for every individual in the group ensures their perpetuation. Though the specific ways in which foraging societies in various parts of the world support and mandate closeness and cooperation are different, the fact of that mandate (and indeed, many of the ways) is unquestionable.

It is within the security of the family, the universe of kin, and in the daily presence of conventions of reciprocity and ceremony that children in nomadic foraging societies grow and learn. Children in these societies are full participants in the life of the band. They have great significance for everyone in the group and consequently easily acquire a high level of self-esteem (e.g. Shostak, 1981; Turnbull, 1961). Everyone in the band is related to the children of the band, knows them well, sees them grow and develop. It is likely that human children have grown and learned in environments of closeness, connection and participation very similar to these for most of human existence.

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*I am indebted to Kalman Glantz for this observation and for many others throughout this dissertation.

The Social Context of Learning:
Individual Identity and Status

The emphasis on closeness and unity in the section above may give the impression that people in hunting and gathering societies are always in some sort of idyllic harmony, always concerned for one another, always connected. However, this is not the case. What Marshall says of the !Kung may be generalized to describe other nomadic bands: "Their security and comfort must be achieved side-by-side with self-interest and much jealous watchfulness" (1976: 350). Life in nomadic foraging societies has in common with life in other primate societies a dynamic balance between the ties that bind and the need of all to establish identity and status in the group and to look out for themselves.

One might say that individuality is "guaranteed" in a nomadic foraging society. The size of the group that forms The People is small enough to admit no strangers, and everyone is a one-of-a-kind because so much is known about everyone by everyone else.

> In a small and intimate community all people are known for their individual qualities of personality. Few or no strangers take part in the daily life. So men and women are seen as persons not as parts of mechanical operations, as city people see so many of those around them (Redfield, 1953: 9).

One couldn't escape this individuality if one wanted to, giv-

en the context of closeness that marks gathering and hunting bands, and it creates another major part of the backdrop against which all activities of life in these societies take place. Turnbull describes a Mbuti family that resided in the band he studied.

> [Ekianga] was a very great hunter... He was hairy, broad-chested, and powerful almost to the point of ugliness... He always built his huts in a different shape from everyone else's and in the Pygmy camp near the village his house was the biggest and the smartest of them all, sheltering his entire menage.
>
> His youngest wife was a beautiful girl called Kamikan. She was even lighter than most Pygmies, yellowish-brown instead of the more usual coffee-brown. Her brother and mother also lived with the same hunting group. [Her brother] Amabosu was a very temperamental Pygmy. He was a fine hunter, but he was particularly renowned as the best singer and best drummer and best dancer in the area; for these qualities alone his prestige was enormous. His skinny old mother, Sau, was not without fame of her own. Old and infirm people, amongst the Pygmies, are regarded, not exactly with suspicion or mistrust, but with apprehension (1961: 35).

As suggested in the quotation above, status in a gathering and hunting band is directly related to the level of one's skill in particular areas as well as to personal qualities. It is obvious to all, earned in the context of skills all share, and must be validated continuously. Ekianga was "a very great hunter," and Amabosu was the "best singer and best drummer and best dancer in the area." At first these distinctions may seem to imply a paradox, for there is little specialization of function in hunter-gatherer societies. Everyone hunts, everyone sings and drums and dances.

All are engaged in the same activities, more or less, though not necessarily at the same time or in the same sequence.

> Every Netsilik Eskimo had to look after his own equipment, make new weapons, and repair the old ones. Despite the complexity of articles such as the kayak and the composite bow, every man had the skills and tools to be technologically self-sufficient (Balikci, 1970: 4).
>
> [Among the Mbuti] there was...little apparent specialization; everyone took part in everything (Turnbull, 1961: 110).

But it is in precisely this context of skill that all share and acknowledge as essential that status is gained, leadership developed, and power exercised, and it is likewise this context that prevents the institutionalization of power and leadership. If a hunter continually returns with large game, everyone witnesses his success, his perfection of the skills all other men must also exercise -- in spite of any arrangements either by him or the society to diffuse his singularity. Each individual in a band is perfectly aware of what it takes to excel in a particular activity. Everyone is using the same criteria for judgment of performance, so to speak.

For those of us in a modern society where celebrity is often simply a matter of public exposure in the context of unclear criteria rather than a reflection of personal merit in the context of agreed-upon criteria, this is a foreign notion indeed. While all the members of a hunting and gathering band are engaged in the determination of

their individual identity and place within the group, all are making their interpersonal assessments on the basis of criteria that are shared. There is no room for faking it in such a society; the context of closeness won't allow it.

What specialization of activity that is to be found in nomadic foraging societies is in the realm of the ceremonial, the medicinal, or the supernatural. Most gathering and hunting societies recognize shamans, healers, or ritual leaders, and in most societies it is also acknowledged that not everyone can become one. Among the !Kung !kia occurs anywhere from once or twice a week to several times a week, and while all are involved in the ceremony, either dancing or singing, only certain people actually go into the healing trance, or receive n/um as the !Kung say. The ability to receive n/um and use it effectively for healing is respected by the society as an important achievement. Individuals take pride in being n/um masters (Katz, 1976, 1982). A Netsilik shaman, or angatkok, is "generally respected and feared for his supernatural powers" Balikci, 1970: 225). Among the Mardudjara of Australia

> men who most often use their special powers for socially approved ends are termed Mabarn throughout the Western Desert; the same term refers to the magical stone or shell objects they are said to carry in their stomachs... Most Mabarn inherit their special powers from their fathers, but Mabarn objects can be obtained from others. Almost all are men, and perhaps 10 or 15 percent of Mardudjara males are Mabarn (Tonkinson, 1978: 107).

One would think it inevitable that, given the importance of healing and ceremony in nomadic foraging societies, practitioners in these areas would have a kind of generalized status in the group, that they would become official leaders. But leadership, influence, and status are extraordinarily complex in these societies because they are realized in the context of closeness and in the exigencies of a direct connection with the physical environment.

> Nothing in their appearance or demeanor distinguishes Mabarn from their fellows, and as specialists they practice part-time only, since all their other activities are the same as those of other men. Their distinctiveness lies in their possession of special skill, knowledge, and psychic powers that give them greater and more effective access to the spiritual realm (Tonkinson, 1978: 107).

In daily life the Netsilik shaman "behaved like an ordinary hunter" (Balikci, 1970: 225), and a !kung n/um master "remains an ordinary person during his non !kia state rather than an intimate of the gods or a chosen instrument" (Katz, 1976: 294).

There are no official positions in gathering and hunting societies (though there is certainly leadership, little generalization of authority from one activity to another, and no social hierarchy that exists outside of personal merit and the organizational relationships such as kinship described above. Decisions are made and status is achieved in this seemingly unlikely context, but the process is indeed complex.

> [Among the Tiwi of Melville Island in Northern Australia] influence and career patterns can best be compared to a sort of nonstop bridge game wherein the scores were never totaled up nor a new game ever started on a clean slate. Wherever an observer came in, he always entered in the middle of the game and found the current hands being played with all the old scores back for at least two generations influencing the play of the present hands. The game never had a beginning or an end; every new player had to start in the middle and make the best of whatever assets he had by way of kinship, clanship, household membership, and help from older players. Similarly, any attempt to describe the operations involved or the "rules" of the game must perforce start in the middle (Hart and Pilling, 1979: 51-52).

Leadership in nomadic foraging societies is not reflected in a structural guarantee of influence; it is an acceptance of responsibility.

> [The leader of a Netsilik Eskimo band] was referred to as inhumataq, or the one who thinks. In summer he gave the signal for the beginning of fishing or caribou hunting, and he decided matters pertinent to migration and camp selection. Yet all these decisions were taken informally and gently, in consultation with the other adult hunters of the extended family, involving long discussion when everyone present could freely express his opinions. In a sense the headman's task was to achieve consensus without hurting the feelings and designs of the other hunters, whose autonomy he respected (Balikci, 1970: 116).

One has the impression that when leaders do emerge in foraging societies they are people who are skillful in many areas and embody qualities important to the group. The position of isumataq was not automatically bestowed upon the oldest active male in a

Copper Eskimo band (Damas, 1969); the position had to be assumed or filled by someone. Though isumataqs were in fact often the oldest active males in the group, these men rose to the occasion in the context of the expectations of the band. If they had not been able to facilitate the activities of the group others would have had to step in, for the subsistence needs of an Eskimo band will not allow incompetence in a leadership role.

Even though leadership among the Eskimo seems to be more like moderating a discussion among peers than telling others what to do, most gathering and hunting societies have even less formalized leadership than do the Eskimo.

> Perhaps the most crucial aspect of the balance of power [in !Kung society] is the process of leadership and decision making. Determining how the !Kung actually make important decisions is quite difficult. With no formal leaders or hierarchies, and no political or legal institutions to convey authority, decisions are made on the basis of group consensus. Each group has individuals whose opinions carry more weight than those of others -- because of age, of having ancestors who have lived in the area longer, or of personal attributes such as intelligence, knowledge or charisma. These people tend to be more prominent in group discussion, to make their opinions known and their suggestions clear, and to articulate the consensus once it is determined. Despite their lack of formal authority, they function very much as group leaders (Shostak, 1981: 245).

Turnbull describes Moke, an older hunter of the Mbuti band Turnbull travelled with, as a kind of leader who sometimes took responsibility for settling disputes and whose opinion carried a

certain weight with others, but emphasizes that "Pygmies dislike and avoid personal authority, though they are by no means devoid of a sense of responsibility. It is rather that they think of responsibility as communal" (Turnbull, 1961: 125).

Every member of a gathering and hunting society is concerned with his or her personal, individual place and status in the group. But this status is elusive, and while it may be connected in some way to kinship relations and ancestral prerogatives it is, in practice, apparently more a function of who does best, commands the most attention, makes the best case, has the most knowledge, etc. Because every skill and area of knowledge is important for survival and/or well being in these societies status, power and influence are remarkably diffused throughout the members of hunting and gathering bands: between men and men, between women and women, and between men and women as well. The most successful healer may not be the most successful hunter. Among the Birhor of Southern India the hunt leader and the ceremonial leader is rarely the same person, though there is apparently no formal prohibition of this dual leadership (Williams, 1969). Although the Mbuti hunter Cephu was roundly castigated by the other members of the group for deploying his nets in advance of the others during a hunt (see below), he was also recognized as "the finest storyteller in the forest" (Turnbull, 1961).

The balances between the dimensions of status, individual significance, etc. and the need to belong and cooperate ensure

that everyone in a gathering and hunting group can be competent (because the skills that all share are of ultimate importance) and that nearly everyone can excel in one area or another. The lines of power and status and individuality in gathering and hunting societies, like the lines of relationship and reciprocal obligation, crisscross and overlap. Like food, there's some for everyone. Everyone knows what competence consists of, so it does not have to be demonstrated through competition. Hunters do not need to vie with one another; gatherers needn't struggle to see who can bring in the biggest load. There are so many ways in which to distinguish oneself -- ways that are recognized by and important to all the other members of the group -- that everyone is distinguished.

The Social Context of Learning: The Resolution of Disputes

In the resolution of disputes many of the most important characteristics of gathering and hunting societies come together. Status and prerogative are often at stake, kinship is prominent, temporary leaders emerge, the entire group becomes involved and the ties and conventions of reciprocal obligation come to the fore.

The context of closeness produces friction as well as reassurance as individuals attempt to identify themselves in relationship to the other individuals in the group. Tensions develop, grudges are held, fights break out. Among the Mbuti,

> sometimes someone would apparently have a grudge against a neighbor, or a dislike for someone who had built a hut opposite. I saw several women turning the entrances of their huts to point in different directions, toward friends or relatives. During the course of any one camp women are continually adding to their huts or changing the way they face. I found that a good way of keeping track of the little jealousies that exist in any small community was to make a daily plan of the camp, noting which huts were being altered to face in which direction (Turnbull, 1961: 68).

There is little privacy in a foraging band, and sooner or later most things come out. Shelters are usually placed so closely together that much of the group can hear talk between husband and wife, children's questions and cries, arguments, etc. Therefore, if feelings are hurt, if someone is insulted, if jealousies and suspicions emerge, they soon become part of the experience of the entire group.

Natually, when there are disagreements between individuals or groups of individuals the response of the other members of the band varies according to the seriousness of the dispute. When Cephu set his nets in advance of those of the other hunters he was committing a grave crime as far as the other members of the Mbuti band were concerned.

> Ekianga leaped to his feet and brandished his hairy fist across the fire. He said that he hoped Cephu would fall on his spear and kill himself like the animal he was. Who but an animal would steal meat from others? There were cries of rage from everyone, and Cephu burst into tears...
>
> I had never heard of this happening before, and it was

> obviously a serious offense. In a small and tightly knit hunting band, survival can be achieved only by the closest copoperation and by an elaborate system of reciprocal obligations which insures that everyone has some share in the day's catch (Turnvull, 1961: 106-107).

People in foraging societies are so intimately connected with one another that there is, of course, tremendous pressure to be part of the group.

> I think that most !Kung cannot bear the sense of rejection that even mild disapproval makes them feel. If they do deviate they usually yield readily to expressed group opinion and reform their ways. They also conform strictly to certain specific useful customs that are instruments for avoiding discord (Marshall, 1976: 315).

It is in the intesest of everyone in a foraging band that things run smoothly, because social disintegration also means the reduction of the group's ability to acquire food and perform important ceremonies. Survival in such a society means much more than simply obtaining food and shelter, and Turnbull says of Cephu that "it was unlikely he would do the same thing again in a hurry" (Turnbull, 1961: 10).

Nevertheless, ethnographers have expressed surprise at the joking that often accompanies even the most serious occasions. In many cases an offended party is cajoled out of his her bad mood with jokes and jibes. In the midst of the most serious denouncement someone might pipe up in the darkness of the night camp

and ridicule the denouncer. Ridicule, in fact, is a common mode of exchange in gathering and hunting societies and serves to humble the arrogant as well as chastise the transgressor. Often small disputes are resolved through ridicule and banter with "everyone having a good time" (Meggitt, 1962).

The involvement of all in the resolution of disputes is characteristic of foraging societies. In the small space of, say, an Mbuti encampment, where everyone is related and loyalty -- like everything else -- overlaps, it isn't long before everybody joins in, and the dispute serves as the focus of an important group activity. The interesting thing is that no one seems particularly anxious about what is fair or unfair, right or wrong. There is no weighing of evidence, no pretense of impartiality, no references to higher law: "Disputes were generally settled with little reference to the alleged rights and wrongs of the case, but chiefly with the intention of restoring peace in the community" (Turnbull, 1961: 118).

A good example of the priority of the reestablishment of continuity and peace in the resolution of difficulties is to be found in Turnbull's description of the events surrounding one family's use of a certain kind of hunting magic that apparently brought them extraordinary luck. Envy began to build among the other families in the band.

> It is difficult to say whether this form of magic is of Pygmy or Negro origin. I rather think the latter, because only a few families practiced it, and they were highly criticized by the others as being antisocial. They were trying to get success for themselves at the expense of the others. On one such occasion a family had a long run of good luck, the animals always falling into their net, while others had no luck at all. It was decided that this must have been due to anjo, as the medicine was called, so everyone, including the offenders, agreed that the only thing to do was to destroy the horns that held the medicine. Everyone who had such a magic horn gave it to old Moke and promised not to make any more selfish magic (Turnbull, 1961: 96-97).

Anyone in a foraging society who disrupts the peace knows that something must be done to restore the balance. It didn't matter who had the most success in the hunt, since food was shared, and the real danger, recognized by all, was the growing envy.

Often the long and violent-sounding harrangues that involve the whole band serve as a kind of catharsis as well as entertainment (Marshall, 1976; Goodale, 1971). Both the dispute and its resolution become the property of all. Most often, no formal or official decision is made. People think about the problem, talk among themselves in smaller groups. Those who have offended usually mend their ways. If a gift needs to be given to restore a balance it emerges -- in a week, in a month -- to put things right (Marshall, 1976). And, of course everyone knows, everyone remembers.

Inevitably there are situations that cannot be resolved by joking, arguing or ridicule, by group participation or even by the intervention of kin. People in foraging societies sometimes

come to blows. Often these fights are formalized in ways that seem to be calculated to restore the peace while simultaneously satisfying honor (Goodale, 1971; Balikci, 1970), but sometimes they result in separations that may or may not last over time.

Goodale describes a battle between two Tiwi men, an older man with three wives, and the young alleged lover of his youngest wife, and in this dispute (and in its resolution) we may catch a glimpse of the relationship between the need of The People to stay close to one another and the needs of individuals to define their status and preserve their prerogatives.

> They circled each other, shaking their clubs violently in the air but striking no blows. The lover was then handed a sharp metal-tipped mainland-type spear by his brother, but immediately the husband's brothers shouted that this was not right, and they sent a young boy to fetch the superintendent of the settlement. The threat of the superintendent intervening immediately resulted in the lover's laying aside the spear. The two men returned to wrestling, and the messenger to the superintendent was called back. All within hearing had now surrounded the two men, and a discordant chorus of opinions loudly offered by nearly everyone present accompanied the fight...
>
> Occasionally one of the combatants would be knocked to the ground, at which point he would be helped up by his wife, in the old husband's case, by his eldest wife. Although each man had close brothers among the spectators, they did not come in to help, but I was told that they would have done so had the fight reached serious proportions.
>
> An old woman threw a bucket of water over the two fighters, and they immediately separated, but they continued with a verbal exchange (Goodale, 1971: 132-133).

The fight broke out because the old man had learned that his

youngest wife and the young man had been seen going off into the bush together. His status in the group was threatened (a man with three wives ought to be able to "take care of them" the Tiwi say), and he acted to protect it. When the fight threatened to get out of hand with the addition of spears, kin intervened but did not try to stop the fight altogether. Everyone in the village got involved in the fracas, and as the two men flailed away at each other the other members of the group argued the matter back and forth with gusto. Finally, an old woman, no doubt a relative of one or both men, stopped the fight in a humorous manner that served as a joke for the whole band and, in a sense, ridiculed both combatants.

Because of the constant, expected movement among groups, the universal practice of visiting and the importance of this activity in the foraging way of life, it is possible to resolve most any quarrel, no matter how serious, without a pitched and bloody battle -- and even without an ultimate loss of face for any individual. Goodale concludes her description of the battle with these words: "...by next morning the old man had left the settlement with his three wives, and he remained camped across the bay for ten days (p. 133).

Those who get along well on a regular basis spend a lot ot time travelling and camping together, but everyone has close ties with individuals in other bands, and everyone visits or is visited frequently throughout the year. In this fashion tensions are

relaxed, grudges eased, and disputes resolved by time and separation.

The Social Context of Learning: The Sexual Division of Labor

The sexual division of labor as a principle of social organization in nomadic foraging societies is an intricately balanced system of expectations, duties, understandings and emotional ties. In almost all gathering and hunting societies men fulfill the primary hunting obligations while women gather vegetable foods and have the primary responsibility for child care. As noted above, in Eskimo societies, where there is little gathering to be done, women have exclusive rights to sewing and clothing manufacture as well as primary responsibility for child care, and the Agta, a group in which women regularly hunt, maintain a division of labor. In no other dimension of life in nomadic foraging societies are the balances between closeness and belonging and status and prerogative more important, or more complex, than in the sexual division of labor.

This division, and the other reciprocal relations that flow out of it, are crucial elements of the environment of learning in nomadic foraging societies, and, as we have seen, there is good evidence to believe that these kinds of relationships are fundamental human social adaptations. In the context of the sexual

division of labor, children in hunting and gathering societies identify themselves as individuals and as members of the group. Gender identity in these societies is the paramount constituent of personal identity. In this context children learn what is expected of them and what their prerogatives are, they perfect skills and gain knowledge that will enable them to survive in the physical environment and live satisfying adult lives in the social environment.

In much the same way that primate studies used to focus on dominance hierarchies in monkey and ape societies as fundamental principles of social organization, early studies of foraging societies focused on the political and ceremonial "dominance" of males and the conventions of patrilocality (e.g. Service, 1962). Subsequent work has shown, however, that as is so often the case, the reality of life is a good deal more complex.

> In summarizing the evidence concerning male-female relations, we see that women predominate in some spheres of behavior and men in others; the overall sense of the relations between the sexes is one of give and take. Both sexes work equally hard, with men working longer hours in subsistence and tool making and women working longer hours in housework and child care. Women's subsistence work is more efficient and productive than men's, so they provide more of the food despite their shorter work week. In marriage arrangements women exercise some control, and they initiate divorce far more frequently than men. On the other hand, the fact that the men are so much older than their wives at marriage may tip the balance of influence within the marriage in favor of the males (It should be noted that in about one out of five !Kung marriages the woman is older than the man -- up to 20 years older -- and in

> these unions the woman's influence usually predominates)...
> On balance, the evidence shows a relatively equal role in society for the two sexes, and the !Kung data certainly do not support a view of women in "the state of nature" as oppressed or or dominated by men or as subject to sexual exploitation at the hands of males (Lee, 1979: 454).

Tonkinson reports a similar balance for the Mardudfara aboriginies of Western Australia (1978); and Jane Goodale writes of the Tiwi of Melville Island: "Although the opportunities for prestige and self-expression do not appear to be as great for the female as for the male Tiwi, the basic equality of the two sexes as unique individual members of the society is stressed in the culture" (1971: 338).

Goodale emphasizes what she calls the "different character of the male-female world" (p. 335) and hypothesizes that although "personal achievement seems to be the dominant value for which Tiwi males and females strive during their existence in the world of the living" this achievement comes, and is measured, in different ways for males and females.

This suggests that it is a mistake to compare the authority and status of men with the authority and status of women in a simplistic fashion. The status of each, and ways of measuring that status, may exist (at least partially) in two different dimensions -- much like the axes of dominance and matrifocality in primate groups described in Chapter 2. What we observe in gathering and hunting bands seems to be a balance that addresses the physical and psycho-

logical well being of every member of the group -- male and female, young and old -- even though we may have difficulty understanding the elements of that balance from the outside.

Most modern ethnographers describe women in foraging societies as having considerable influence in the decision making processes of the group.

> The woman is not discriminated against in Mbuti society as she is in some African societies. She has a full and important role to play... A man is not ashamed to pick mushrooms and nuts if he find them, or to wash and clean a baby. A woman is free to take part in the discussions of men, if she has something relevant to say (Turnbull, 1961: 154).

> The sentiments of the Lynx Point Athapaskan society... to not rigidify this division of labor between the sexes... The day-to-day relations between husband and wife are fairly egalitarian (Helm, 1961: 74).

It is very difficult to separate the lines of "official" status (such as exist) which are often more the province of men, from the actual workings of authority and influence in a gathering and hunting band. Greenway, writing about the Australian aborginies, reports that "in religious matters women are rubbish" (1972: 103), and although this has been shown to be manifestly untrue (e.g. Tonkinson, 1978; Hiatt, 1968; Goodale, 1971) it nonetheless describes what seems to be taking place in the realm of the ceremonial as viewed through the eyes of Westerners who are apparently expecting linear social relationships. Actually Australian women

have their own ceremonial sphere which they view quite differently from the men.

Indeed, is is difficult to assess the character of shared and balanced authority and status in the sexual division of labor. According to Shostak

> Women's status in the community is high and their influence considerable. They are often prominent in major family and band decisions, such as where and when to move and whom their children will marry. Many also share core leadership in a band and ownership of waterholes and foraging areas. Just how influential they really are and how their status compares with that of men is a complicated question: women may, in fact, be nearly equal to men, but the culture seems to define them as less powerful. In other words, their influence may be greater than the !Kung -- of either sex -- like to admit (Shostak, 1981: 13).

Shostak's assessment may serve as an example of the difficulty mentioned above. Are the !Kung playing some kind of trick on themselves when they define power in their society? Or is it more likely that the definition itself is part of the reciprocal relationship and only seems to represent a contradiction when called forth by an anthropologist?

It is conceivable that a considerable amount of the power and status of women in nomadic foraging societies is unvoiced simply because it is so obvious to the members of the society. Women in these groups are the "life force" (Turnbull, 1961), for they bring children into the world. Perhaps the unquestioned importance of

children to gathering and hunting societies, and the deep ties that accompany mother-child relations, form the foundation of one dimension of status and influence* while the importance of meat and matters ceremonial forms the foundation of another.** Shostak quotes one of the few female n/um masters in the Dobe area:

> I am a master at trancing to drum-medicine songs. I lay hands on people and they usually get better. I know how to trick God from wanting to kill someone and how to have God give the person back to me. But I, myself, have never spoken directly to God nor have I seen or gone to where he lives. I am still very small when it comes to healing and I haven't made these trips... I am a woman, and women don't do most of the healing. They fear the pain of the medicine inside them because it really hurts! I don't really know why women don't do more of it. Men just fear it less. It's really funny -- women don't fear childbirth, but they fear medicine! (Shostak, 1981: 303).

It is important to see that the specific roles of the sexual division of labor in day-to-day situations appear to be more flexible than might be expected. The most powerful healer in the Dobe region during the time Katz studied the healing ceremonies of the !Kung was a woman (Katz, 1982). Of course, there are strict divisions too. During certain parts of the male initiation ceremon-

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*As it does in all primate societies

**There may be a relationship between the greater flamboyance and aggressiveness of males in nomadic foraging societies and the greater flamboyance and aggressiveness of males in other primate societies, but a great deal more study is required before this relationship can be described with any confidence.

ies among the Australian aboriginies women are forbidden from attending (Tonkinson, 1978; Strehlow, 1971; Berndt and Berndt, 1964). Netsilik men never sew hides (Balikci, 1970). But in the larger context of life in a nomadic foraging society even these strict prohibitions and rigid customs become pieces of a great puzzle of reciprocity and balance. During other parts of the Australian male initiation ceremony females are essential, and women exert a considerable amount of influence in the determination of who performs what role in all parts of the initiation rites (Goodale, 1971; Tonkinson, 1978). While Netsilik men do not sew hides, the task of thinning them by scraping is theirs (Balikci, 1970).

Many ceremonies in nomadic foraging societies acknowledge and celebrate both the connections and the differences between men and women. Among the Mbuti the two most important ceremonial activities are the molimo and the elima. The molimo is a kind of multipurpose ceremony used for healing, for what might be called "community building," and in general "... the Pygmies call out their molimo whenever things seem to be going wrong" (Turnbull, 1961: 91). At first Turnbull thought that the molimo was exclusively for men, but then one night, without any preparation that Turnbull could divine, the molimo ceremony was joined by the women of the band and an old woman who was visiting the camp.

> There is an old legend that once it was the women who "owned" the molimo, but the men stole it from them and ever since the women have been forbidden to see it.

> Perhaps this [addition of the women to the ceremony and the resultant "binding" of the men] was a way of reminding the men of the origin of their molimo. There is another old legend which tells that it was a woman who stole fire from the chimpanzees or, in yet another version, from the great forest spirit. Perhaps the dance had been in imitation of this. I did not understand it by any means, but somehow it seemed to make sense (Turnbull, 1961: 154).

By the same token, the elima ceremony is organized and run by the women to mark a girl's first menstrual period. But the young men of the village are important participants in the elima and a "father of the elima" is designated from among the girl's older kinsmen.

Though there is "men's work" and "women's work" in nomadic foraging societies there are many situations in the context of this way of life in which work is combined or in which the lines between make-female roles are blurred. When Nisa, the !Kung woman (Shostak, 1981) had her first child her husband went out gathering and brought the food he found back to the new mother. Surely it would have been possible for a kinswoman to perform this task, thus preserving a strict division of labor. But no such custom has developed in !Kung society. Indeed, !Kung men often gather when returning from an unsuccessful hunt, and even more consistently they relay information about the location of plant foods to the women. At the same time, the women report on the animal spoor they have seen while gathering and often take an active and influential part in the pre-hunt conversation (Lee and Devore, 1976).

As noted above, Agta women do a considerable amount of hunting, though hunting is still considered by both sexes to be primarily "men's work," and the society maintains a division of labor by sex in other areas of life (Griffin and Griffin, 1981). Mbuti women and children beat the jungle to drive animals into the nets of that waiting men (Turnbull, 1961), and Eskimo women and children help in the spring seal hunt and in the construction of salmon weirs. A Netsilik couple builds an igloo cooperatively; the man works inside the structure and woman works outside (Balicki, 1971).

The sexual division of labor in nomadic foraging societies is the basic framework through which the balances between attachment to others and personal status are achieved. Associated with it are subsistence success, family and kinship structures, and ceremonial meaning. In order for the division to have existed over time, it must have ensured cooperation, reciprocity, and equality. At the same time, the division of labor affords males and females somewhat different kinds of experience within which to identify themselves and acquire status. These different dimensions of experience enable The People to avoid competition between the sexes, which helps make it possible to live successfully together in an extraordinarily (by Western standards) intimate social environment

The Social Context of Learning:

Attention Structure

While a detailed description of the attention structure of nomadic foraging societies and the effect it has on children's learning is beyond the scope of this study, there are several prominent foci for children's attention that have probably existed in human societies for millions of years, for they are inevitable consequences of the foraging way of life. Although these descriptions of who pays attention to whom in gathering and hunting societies seem very obvious when stated, it is important to note them briefly here, for they will form the foundation of a discussion of the environment of learning in our own educational institutions in the next chapter.

Gender identity and roles. As noted above, the sexual division of labor forms a fundamental dimension of the life of these small societies, and boys and girls draw much of their personal identity and sense of self from this context. Although very young children of both sexes are treated pretty much the same by all adults, they begin to pay attention to the activities of the adults of the same sex more and more as they mature -- and the adults begin to treat them differently too.

> So a fond [Mbuti] father will make a tiny bow for his son, and arrows of soft wood with blunt points. He

> may also give him a strip of a hunting net. A mother will delight herself and her daughter by weaving a miniature basket. At an early age boys and girls are "playing house." They solemnly collect the sticks and leaves, and while the girl is building a miniature house the boy prowls around with his bow and arrow (Turnbull, 1961: 128-129).

The inevitability of the roles of both males and females in nomadic foraging societies makes the question of whether the focus of a child's attention on same-sex role models is a result of internal motivation or external socialization irrelevant. Boys will become hunters, tool makers, fathers; girls will become gatherers, makers of their own tools, mothers. These are the things that men and women do in life. It is important to note that this inevitability is not considered oppressive by the people. What men do and what women do is natural for members of a foraging band, and it is interesting that the reinforcement for adopting a sex role in gathering and hunting societies often contains no negative prohibitions (e.g. Shostak, 1981).

The family. If it is true that as children grow older they tend to focus their attention on the things that must be learned in order to become a man or a woman, it is also true that men and women know each other's work very well indeed. Girls in foraging societies know a great deal about hunting from watching their fathers, brothers and male kin, from listening to them talk about the hunt, from listening to the women's interpretations of animal

spoor encountered during a gathering expedition (Shostak, 1981). By the same token, boys accompany their mothers on gathering trips well into their childhood, and through watching their mothers and kinswomen they learn about plants, how to get at them, and how to prepare them.

Through the family structure in which both mother and father are important foci for the children's attention, a tremendous amount of common information is imparted, and in interactions with relations and other adults this information is refined and extended. In every foraging society three and sometimes four generations are almost always represented. Thus, important constituents of the environment of learning in these societies are grandparents. Old folks in these societies, freed from the most arduous activities of subsistence, do have a great deal of leisure time and often spend it with children.

> If [Pygmy children] can't find a frog they go and awaken one of their grandparents and ask him to play at being an antelope. He is then pursued all over the camp, twisting and dodging among the huts and the trees, until finally the young hunters trap their quarry in the net, and with shouts of delight pounce on him (Turnbull, 1961: 129).

> [Among the Netsilik Eskimo] relations between grandparents and grandchildren were marked by ceaseless fondling and joking. As soon as a child entered the dwelling of his grandparents he attracted their attention. He was given food and immediately became the object of loving care, mild joking, and teasing. Although he was visibly adored by his grandparents, the child behaved with some restraint and considerable respect. In later years,

> when the grandson became an active hunter, he contributed to the support of his grandparents, together with the other men of the extended family (Balikci, 1970: 122).

Though it seems that grandparents do not actively "teach" the young or train them in the ways of a foraging existence, clearly a considerable amount of what children learn is learned from the elder generation. As the old folks talk among themselves in a !Kung camp and tell stories (Biesele, 1976), the children watch and listen as they go about their play. In addition to important information, skills, and the history and lore of The People, children learn how it feels to be old. They can see how the elderly struggle to keep up with the nomadic band (e.g. Turnbull, 1961; Schebesta, 1927; Balikci, 1970) and hear the complaints of those who are not well provided for by their children or grandchildren.

The adult context. A child in a nomadic foraging society is constantly exposed to and interacting with adults of many ages and degrees of relationship -- adults who are all doing similar tasks within the gathering and hunting lifestyle but who have distinct personalities, areas of expertise, likes and dislikes, and amounts of status in particular circumstances. The importance of this element of the environment of learning for children in these societies cannot be overemphasized, for it is in observing and imitating (and learning from the mistakes of) adults in the band that children learn the skill, the knowledge and the responsibil-

ities of adulthood. They refine and check the things imparted to them through the direct family structure and learn what the boundaries of behavior actually are, as opposed to what they are said to be, what status consists of and how it is achieved, and how problems may be solved in a variety of ways.

The children of the Mbuti band described by Turnbull witnessed Cephu's castigation as a bad hunter but also listened eagerly when Cephu the great storyteller told a tale. Neither the battles, the arguments, the accusations, the successful hunts, nor the heroic solitary birthings can be hidden from the young. All around the children, at all times, adults who all have the same skills are utilizing them in individually different ways and with varying success. The children see that a great hunter may be a clumsy dancer, or that a successful shaman may make a poor sealing spear. In all foraging societies the children experience, forst through observation and then through direct involvement, the confusion, the intensity, and danger and the pleasure of sexuality, for "nothing is hidden in the igloo" (Balikci, 1970) or in a hut that is part of an encampment of 10 or 15 similar huts.

Without institutionalized positions to flatten out personalities and routinize interpersonal relations, adults in foraging socieites are, to the young, complex, changable beings who have both success and failure, who are at times joyful, at other times depressed, who snap and agrue and love and sing and dance. Children in hunting and gathering socities are close by way of kinship, marriage,

or simply intense daily association to every adult member of the band and thus have a range of role models with which they might identify or from which they might appropriate bits of skill, knowledge and behavior in the formation of their own identities.

Other children. Just as children in foraging societies learn about what it is to be old by living with and observing the old, just as they learn about adulthood by watching and interacting with different adults, they learn about children (and themselves) from being in close contact with other children constantly.

> At Apa Lelo [the children's bopi, or playground] was on the shore where the river twisted around an island and one branch of it cut in almost between Cephu's camp and the main camp. The water was fairly shallow there, and all day long the children splashed and wallowed about to their heart's content. If they tired of that, they had a couple of vine swings in their bopi; one was a small one for younger children, and the other was hung from two tall trees. Infants watched with envy as the older children swung wildly about, climbing high up on the vine strands and performing all sorts of acrobatics (Turnbull, 1961: 128).

Children are not segregated by age in gathering and hunting societies. If the group is large enough, and there are a number of children who are roughly the same age, age-mate play groups form (Balikci, 1970; Helm, 1961), but these are by no means exclusive, nor are they institutionalized in any way by the adults.*

*One may speculate that the formation of age-mate play groups is connected with developmental stages (see Chapter 5).

in no case is there any attempt by the adults to match children of the same age or keep them together. The children form their own relationships in the contexts described above.

> [Among the !Kung] a typical band of children joined temporarily in some play in the village might include a 5-year-old boy, an 11-year-old girl, a 14-year-old boy, and a 1-year-old toddler hanging on the fringe of the action (Draper, 1976: 202).

> [Among the Lynx Point Athapaskans] we find the self-conscious, seventeen-year-old Eddie playing tag with a four-year-old (Helm, 1961: 94).

Older children provide models for younger children and, of course, older children learn about babies and toddlers by observing their younger brothers and sisters and those of other families directly. It should be emphasized here that the older children are never forced or trained to assume responsibility for their younger siblings. This is not to say that this responsibility is not assumed by older children, for they inevitably become the leaders of the play group and thus automatically assume a certain responsibility for the younger children. But these older children are not held <u>accountable</u> by the adults for either the safety, the instruction, or the behavior of the younger children.

<u>Discipline: compelling attention</u>. The discipline of the young as we understand it in modern technological society, is a mode of

compelling attention so that children may learn what we would have them know and behave in an acceptable manner. Little of what we would consider discipline occurs in nomadic foraging societies. As noted above, the behavior of children in these societies is rarely constrained. Children are almost never beaten and have an extraordinary amount of leeway to do pretty much as they please.

In many gathering and hunting societies maturation is conceived of as the acquisition of a certain something. The Utku Eskimo say that a child acquires ihuma which "refers to all functions that we think of cerebral: mind, thought, memory, reason, sense, ideas, will" (Briggs, 1970: 375). The !Kung explain the tantrums and disobediance of young children by saying that their intelligence has not yet come to them.

> There is no doubt in the parents' mind that as children grow up they will learn to act with sense, with or without deliberate training, simply as a result of maturation, social pressure and the desire to conform to group values. Since most !Kung adults are cooperative, generous, and hard-working, and seem to be no more self-centered than any other people, this theory is evidently right, at least for them (Shostak, 1981: 149).

It is likely that parents and other adults in gathering and hunting societies are as indulgent and patient as they are because the the only option for a child in a foraging society is to become an adult in a foraging society: "What else is there for [Pygmy children] to learn except to grow into good adults?" (Turnbull, 1961:

128). Although there is considerable opportunity for individual expression in such a society the framework itself is not a matter of choice -- integrated as it is with the cycles of the physical environment and balanced as it is between individual and collective needs. Thus many of the occasions for discipline which confront parents in modern technological societies simply do not come up in foraging societies. Children needn't be forced to comply with their parents' wishes, because at an early age they begin imitating (and assessing) their parents' behavior and activity and gradually become contributing members of the band themselves. There is no need to make children do things "for their own good" in these societies because there is no difference between what is good for them and what is good for everybody else, no difference between what they see going on all around them and what their adult lives will consist of. The discipline-like activities we do see occasionally in gathering and hunting societies are most often a reflection of lost patience or momentary anger on the part of an adult rather than demands for some kind of generalized obedience (e.g. Tonkinson, 1978).

By far the most common form of discipline of young children in all foraging societies is joking and ridicule. Children are teased and scolded humorously. If they get angry at the teasing they are not punished for demonstrating their anger. Among the Mardudjara

> temper tantrums are tolerated with great patience and resignation by adult -- and less so by older siblings. The offended child is rarely disciplined unless it is jealously threatening violence against a younger sibling or one of its parents at a time when they feel unwell.
>
> ...The usual adult reaction to temper tantrums is to cover the face and other vital parts as best one can while the assault continues, and laughingly protest until the child gets what it want, or forgets and goes away (Tonkinson, 1978: 64-65).

> The Netsilik parents' permissiveness, marked by lack of bodily punishment or even scolding, was very characteristic. The small boy behaved like an all-powerful being, doing as he pleased. The parents' anger was provoked only when valuable objects were broken. Occasionally, however, they engaged in teasing and slightly deriding the boy, and mocking came increasingly to be a disciplinary strategy (Balikci, 1970: 106-107).

It should be noted that what Balikci refers to as a "disciplinary strategy" is a common mode of interaction among <u>all</u> members of gathering and hunting societies, regardless of their age. This is not a special strategy developed to affect the behavior of children only. On the contrary, a mode of social intervention and conflict resolution commonly used by all the people in the group is simply applied to children as well.

The Social Context of Learning:

Summary

The social environment of learning in nomadic foraging societies provides for a remarkably smooth transition from childhood to

adulthood. The framework for socialization that is formed by the connection with the physical environment, the balances between the need to belong and the need to acquire status, and the sexual division of labor is an extraordinarily flexible context of learning, yet this framework itself is not a matter of choice. Everything that children in these societies learn contributes to their survival in the physical environment and to their becoming competent members of the group they are born into, and it is likely that similar environments for learning have existed in human societies since the Pleistocene. For as many as 2,000,000 years human children have grown to maturity in small bands made up of families bound together by kinship and other reciprocal ties. In such groups children have, for millennia, acquired personal identity and individual status within a context of common skill and activity. In all those years the sexual division of labor and different dimensions of experience for males and females have characterized the social environment in which children learned to identify themselves and have ensured the equality of the participants in the male-female partnership. No matter what environment the band lived in, no matter what its cultural idiosyncracies, children have, until rather recently, grown up witnessing adult behavior in a wide range of situations, seeing the elderly change and die, seeing babies arrive and develop. These are the cues of the human social environment which call forth, for completion through learning, the socio-emotional responses associated with belonging and

attachment, individual identity and personal importance. This is the social environment in which the active human organism has made its investigations for hundreds of thousands in not millions of years.

Activities of Learning in Nomadic Foraging Societies

In Chapter 2 the primary activities of learning in all higher primate societies were identified as observation, imitation, play and investigative behavior or exploration. These same activities occupy the bulk of a young child's time in every gathering and hunting band.

As with other catarrhines, it is impossible to consider these activities separately, for they form a complex of daily activity for children that begins just after birth and, in a sense, never ends. From the carrying sling close to the mother, infants watch the comings and goings of young and old alike, observe tool making, storytelling, singing, dancing and arguing. Little is done out of their sight, for they are carried everywhere by their mothers. If infants do not actually witness the hunt, they surely hear the men retell it when they arrive back in camp, and if extra-marital liasons are conducted where they cannot be observed, children experience their repercussions when the lovers are found out by the rest of the band.

As they grow older, are weaned, and begin to spend more of their time among their peers, children in foraging societies, like

all children everywhere, actively imitate others -- adults, older children, even animals -- and these imitations become games. Children play at what they see going on around them, and in this fashion they learn the skills and information they will need as adults.

> The [Malaya Semang] children were sitting contentedly, and very silent, apart in the forest, hidden by the undergrowth. "What are you doing there?" I asked little Bunga.
>
> "Making hanya (huts)," he answered, meaning that they were playing house.
>
> They had made little shelters (hanya) in exact imitation of the big ones, and sleeping-places of bamboo. There they were sitting in families, man and wife, all with lighted cigars in their mouths. The fire was burning on the hearth and they were going to do the cooking. They had all decked themselves with flowers and foliage (Schebesta, 1927: 82).

> As her hunting skills increase the kitjina [Tiwi girl] beings to join other children of both sexes in independent expeditions. The children wander about the bush in a gang, playing tag and singing as they go. The boys may take pot shots at birds throwing stones high into the trees and making a contest of it. The girls collect berries, small fruits, and bird's eggs. If anything worthy of cooking is found and they are far from camp, the gang will make a fire, cook, and carefully portion out the food. I once saw one rather small fish divided among eight hungry children (Goodale, 1971: 38).

It is important to note that there is virtually no instruction by adults or older children associated with the children's play. Indeed, it appears that there is a conscious acknowledgement of the value and necessity of learning from experience in nomadic foraging

societies. Goodale writes of the Tiwi:

> We have seen that very young children are allowed literally to play with fire, and never once did I hear a parent telling their child, "Now be careful, dear." The maxim "experience is the best teacher" seems to be rigidly followed... Generally parents or other adults will only interfere in their child's activities when they become really dangerous to some other younger child who cannot fend for itself (Goodale, 1971: 36).

Draper describes a scene in a !Kung encampment:

> One afternoon I watched for 2 hours while a father hammered and shaped the metal for several arrow points. During the period his son and his grandson (both under 4 years old) jostled him, sat on his legs, and attempted to pull the arrow heads from under the hammer. When the boys' fingers came close to the point of impact, he merely waited until the small hands were a little farther away before he resumed hammering. Although the man remonstrated with the boys (about once every 3 minutes), he did not become cross or chase the boys off; and they did not heed his warnings to quit interfering. Eventually, perhaps 50 minutes later, the boys moved off a few steps to join some teenagers lying in the shade (Draper, 1976: 206).

A few pages later Draper adds:

> I never observed a man who was working at this job [dressing an antelope hide] attempted to get help from his own or another child. Nor did the man volunteer information or advice about how the job was done. He simply worked with the children squatting at the edge of the hide watching and nibbling with apparent absorption, then moving on to some other pastime (Draper, 1976: 212).

Finally, Blurton Jones and Konner (1976) provide a good example of the kind of relationship that exists between the learners and

their "teachers" in gathering and hunting societies:

> This indirect adult communication of important information seems comparable to the indirect way young men acquire information about animals and technology, which appears to be quite simply a matter of watching and and listening to other people and then trying for one's self. There is almost no direct teaching. Indeed, Konner witnessed an enlightening argument between some younger men who hunt very little and some older and more active men. The inactive young men accused the older men of having neglected to teach them hunting. The older men countered that this was not something that one taught anybody, it was something that one just did. "You teach yourself" -- a very common phrase among the !Kung -- would be applicable here (Blurton Jones and Konner, 1976: 338-339).

As in other catarrhine societies, the connections between the environment of learning and the activities of learning in nomadic foraging societies are profound in that there is little or no separation between the form and content of a child's socialization. Most of the daily activities are, simply, things that one does. You teach yourself; how should these things be learned except by doing them? By playing with fire or with knives and exploring their properties children learn respect for them soon enough; by playing at sex (e.g. Shostak, 1981; Tonkinson, 1978) a child learns its power and its complexity. Everything must be investigated, experiments must be made (see Chapter 5). A child in a foraging society will become an adult in a foraging society.

Play, or perhaps more properly "playfulness" does not end with adulthood. In all foraging bands in every part of the world

humor, joking, miming, etc. are important aspects of adult interaction as well as children's play. Husbands and wives joke with each other and with their children, and grandparents may easily become involved in children's games. The importance of play in nomadic foraging societies extends through childhood and into adulthood because it is not only a way for children to practice and learn but for the whole group to keep channels of relationship open and reaffirm social values by "testing them in play" (Briggs, 1979). Formal joking relationships are recognized in many foraging societies (Balikci, 1970; Shostak, 1981), and, as intimated above, a good sense of humor, a willingness to engage in a joke or a game, and a desire to entertain others are highly valued qualities.

It is in this context of general playfulness and good humor that children in nomadic foraging societies learn many of the attitudes and values that are most important to the peaceful interaction of individuals in an intimate group.

> That first chortle of joy given by the newborn infant when it realizes that its new world is, after all, just as secure as the old one, is perhaps its first lesson in conflict resolution. Chortles quickly become laughter, and this laughter becomes the Mbuti's prime weapon against conflict, aggression, and violence (Turnbull, 1983: 45).

Children are rarely, if ever, preached to, and lectures, like discipline, are often the results of situational anger on the part

of adults rather than a mode for the inculcation of "right" attitudes and behaviors.

If there is little or no formal instruction in the learning of day-to-day subsistence activities and fundamental values, one might expect that the transmission of the history of The People -- the tales of former times and myths -- would involve some teaching behavior. But as with the learning of kinship structure (Tonkinson, 1978) this is apparently not the case.

> Just as there is no formal education among them, no formal inculcation of mythology occurs and the telling of myths is not given a special place by the Mardudjara in the framework of ritual life (Tonkinson, 1978: 94).

> The !Kung seem to have little interest in teaching the lore of their forefathers to the children. The story-telling groups I observed consisted much more frequently of a small group of old people getting together for some real, grownup enjoyment. The telling of stories among San is no watered-down nursery pastime but the substantial adult pleasure of old crownies over a bawdy or horrific or ridiculous tale. Children are not barred from listening to the stories, and they do wander in and out of a group of storytelling adults as freely as they do at a trance dance. They may listen with considerable interest for a while (Beisele, 1976: 307).

Individual magic, good luck charms, spells, etc. are important in all foraging societies, yet there is no evidence that children are taught these procedures by adults. Netsilik Eskimo children are given amulets to protect and help them at an early age, and continue to acquire them as they grow older, and the adults in

Netsilik society practice certain kinds of magic, both black and white. But apparently these practices are not passed directly from parents or other relatives to children (Balikci, 1970). It is likely that in this realm of informal, individualized magic the children simply observe their elders and imitate them or, since much of this individualized magic is performed secretly, they hear tales of how the magic was made and what its outcome was.

Formal instruction. There are, however, certain areas of skill and knowledge which, in some gathering and hunting societies, are sometimes transmitted to the young through what we might call formal education. These areas are usually the specialized activities associated with healing, ceremony, and the supernatural. Though the amount and intensity of formal instruction in these areas vary between different societies, it is important to note that memorization, rote learning, repetition, etc. were not invented by schools in modern societies but have probably served special purposes in highly charged learning environments for much of human existence.

Among the Mardudjara, the Mbuti and the !Kung very little formal education of any kind takes place. The shamans or mabarn of the Mardudjara are "not required to go through the elaborate special initiations modeled on death and rebirth, that have been reported for the Eastern Desert regions" (Tonkinson, 1978: 197). The !Kung have many trance-dance healers, both male and female, and although there is support for those who would acquire n/um there

appears to be no special instruction in either the acquisition of n/um or the healing activities one engages in using n/um. "Teaching is primarily by example. The teacher has been there before" (Katz, 1976: 295).

On the other hand, among the Eskimo the boys who are to become shamans are selected by the shamans themselves.

> The angatkoks were in the habit of observing the behavior of boys, to discover if some bright young man had received the call. Once selection had been made, the formal training started. Initially the novice joined the household of an elderly angatkok-teacher, where he observed a series of special taboos, such as abstaining from eating outdoors, from eating liver, head, heart or intestines, and from having sexual relations. The novice, assisted by a spirit, slept intermittently and began having visions. Then he moved to a separate igloo where, during a period of several weeks, he was taught the secret vocabulary together with necessary shamanistic techniques and obtained his paraphernalia (a headdress and a belt) from his parents (Balikci, 1970: 225).

> During the winter both Kakut and Kakumee began to receive instruction in the shaman's secrets known to their father, for long ago it had been decided that these two sons of the shaman would follow in the path of old Ajut.
>
> Ajut revealed to his sons all that he himself knew of the spirits and demons, and taught them the magic spells which are spoken in an ancient language. He explained the manner of calling on Kaila, the Wind of the Sky and the great God of all men. He warned the youths of the dangers of Jaija, Apopa and other spirits, and explained how they could master these beings (Mowat, 1951, 183-184).

Many observers (e.g. Strehlow, 1970; Meggitt, 1962; Maddock,

1972) testify to the elaborate formality of the Australian male initiation rites in some aboriginal bands and to the direct teaching of initiates that forms an important component of these ceremonies. Strehlow repeats the description of a Northern Aranda informant:

> The old men took me apart from the other young men of my own age at an early date. They showed me many gura ceremonies which they withheld from the other members of the bandicoot clan because they were still too young.
>
> My elders kept on repeating these ceremonies time and again in my presence; they were afraid that I might forget them (Strehlow, 1970: 115).

Meggitt describes a Walbiri initiation ceremony similarly:

> Each dramatization lasts for about five minutes, and several episodes may be enacted in succession.
>
> The actors retire to the bush to remove their decoration; and men of the boys' patriline harangue him violently, explaining the meaning of the ritual and warning him on pain of death not to divulge the information to women or children (Meggitt, 1962: 287).

As we have seen, children in nomadic foraging societies learn the bulk of what they need to know in order to survive and thrive through the same activities of leaning that are common to all catarrhine species. But there are areas of human experience that are supercharged with meaning, areas of cultural experience in which a significant amount of formal instruction takes place. These areas of individual and social experience are vitally important to The People too, for they serve to extend social bonds into

other worlds and different states of consciousness. They give The People a sense of continuity with the past and with one another, and at the same time they offer individuals the opportunity for profound personal experience, status, and identity.

Formal instruction is most probably not a recent human invention, but it is important to note that although the method appears to be a departure from the activities through which children in nomadic foraging societies usually learn what they need to know, the activity is really not very different from those that form the primary modes of learning in other areas of living. Most of the learning about ceremony and spiritual matters is derived through observation and listening, and by imitating what is seen. From the earliest age, all children are familiar with the fact that ceremonies take place and are important -- even if children have not been permitted to witness them or do not fully understand the conversation surrounding them. Among the Walbiri

> although the youngsters do not attend totemic ceremonies, they often sit with their fathers when the latter discuss ritual matters in all-male company; it is thought that the boys are too young to understand these conversations (Meggitt, 1962: 116).

And again:

> One of the most striking things about !Kung education for !kia is that it is very much a normal process of socialization. Every male tries to become a master of n/um, though he may try more or less hard. Many years before a person seriously tries to become a n/um master

> he is playing with !kia. A group of five-and six-year-olds may perform a small !kia dance, imitating the structure of the dance, the dance steps, and the !kia gestures, at times falling as if in !kia. Through play, the child is modeling; as he grows up, he is learning about !kia (Katz, 1976: 289).

No doubt young Mbuti girls hear about the elima from pubescent girls who are either anticipating the ceremony or have gone through it, and they witness the assault of the initiates on young men at the end of the elima (Turnbull, 1961). By the same token, all children in a foraging band have seen a shaman or healer at work before they are very old. They may not understand the cultural significance or the origin of the words used or the gestures made, but they witness the activities and their results. Certainly if children get sick, they become participants in healing ceremonies.

Participation is the key to an understanding of learning in nomadic foraging societies. If it is true that during an Australian aboriginal initiation ceremony the ritual leaders explain the significance of the events to those being initiated, it is also true that the novices are the central figures in the ceremony. They are the reason for the ritual and they know it. The explanation is never separate from the meaning. Information is always vital, immediate. To use a term coined earlier in this chapter, the "absolute meaning" connected with the subsistence activities one must learn in a nomadic foraging society and the social dynamics

one must become competent with, is extended into the interpretations of spiritual experience that children must also acquire. This kin-like relationship between information and participation, between learning and doing, between skill and application incorporates all activities of learning in gathering and hunting societies. One learns to become an adult in a gathering and hunting society simply by becoming one.

Learning and Evolution: A Summary

In this and in the previous chapter of this study an attempt has been made to describe some of the elements of children's learning from an evolutionary perspective. This perspective assumes that learning in all animals has been shaped by the processes of evolution. What this means is that the ability to learn originated in the context of selection and mutation, and that what is learned affects the survival of the individual in the physical environment and may affect the structure of the genome of the deme. Thinking about learning as an evolutionary process has at least two important implications: (1) learning, like evolution, is a process which consists of random and regulatory elements and normally seeks a dynamic equilibrium, and (2) learning, as a product of evolutionary processes, is mediated by emotional systems that both encourage animals to encounter the physical and social environments actively and frame the context within which they

seek experience.

In Chapter 2 learning in higher primate societies was investigated through the axes of social organization. It was argued in this chapter that these dimensions of social organization were all related to at least three emotional systems that motivated individuals to

a. belong to a group

b. identify themselves as individuals in the context of that group

c. learn

Learning in catarrhine societies serves to acquaint young primates with the environments in which they live and the complexities of the social lives they must lead. The learning is mediated by emotional systems that draw animals together and urge them to acquire status -- and motivate them to interact with their environments.

The activities of learning in all higher primate societies are observation, imitation, investigative behavior, and play; and these activities are admirably suited to the ends of primate learning: to become familiar with and competent in the physical and the social environments. Young primates learn how to do what adult primates do with ease, although there is no instruction in catarrhine societies.

In this chapter evidence for the transition from ape to human has been briefly examined, and it has been noted that the physical and social changes that marked the emergence of hominids and early humans had a tremendous impact on the learning of the young. The old primate axes of social organization were modified significantly, and the balances that enabled these animals of 2,000,000 to 1,000,000 years ago to live in groups yet acquire an increasingly complex individual identity became more refined -- and, ultimately, qualitatively different. With the development of the sexual division of labor, the disappearance of female estrus, the emergence of the human family, the contextualization of male dominance, increased meat consumption, improved tool-making, etc. the early human of the Pleistocene had become a remarkable animal. There was an ever increasing amount to learn, and there were more ways of demonstrating skill and knowledge than were available to other primates. The emotional systems that mediated and were affected by learning became more complex with the evolution of the family and male-female reciprocity.

For most of human existence, children were born into small, egalitarian societies. The demands of the external environment gave an absolute meaning to the activities of living and learning (as they had in other catarrhine societies), and the emotions that motivated learning were directly connected to what was learned and how what was learned should be applied. Learning in such a society was effortless because it was as much a part of becoming an adult

as the acquisition of motor coordination, language and sexuality. Nomadic foraging societies were closeknit groups of relatives who were tied together in ways that are perhaps millions of years old (e.g. mother-infant bonds) and ways that are peculiar to the specific environment and culture (e.g. the !Kung trance dance). At the same time people in these societies were distinct individuals who insisted on being recognized as such by the other members of the group.

In all probability the environments for and activities of learning described in this chapter remained, in kind, essentially unchanged for hundreds of thousands if not millions of years and reflect common responses, adaptations, of the human species. This evolutionary heritage of human beings forms an important part of the human sense of self and the relation of self to community. These emotional motivations represent the deepest layers of human identity and individuality and the deepest layers of the human need to associate, cooperate and organize. Not only are humans motivated to get together, they are motivated to do so with the same needs to belong, particpate and be important that characterize all human societies because these needs have been present in hominid and early human societies for at least a million years.

In the next chapter the ramifications of this heritage for children going to school in a modern technological society like the United States will be explored. If the associations of human learning with fundamental needs to belong and to acquire individual

identity are as old as the species itself (and in many cases older), it is imperative that we try to understand the impact these emotional systems have on the learning of children in the formal educational environments of modern technological societies, for if the purposes of formal education for children today are the subject of vehement debate, the purposes of learning must still be to enable a child to survive and thrive in both the physical and social environments in which he or she lives.

CHAPTER IV

AN EVOLUTIONARY PERSPECTIVE ON MODERN SCHOOLING

Learning has an ancient evolutionary past, and there are emotional systems and activities associated with primate learning in general and human learning in particular that are biologically based and are common to the entire species. Human learning developed as an organic process which prepared children for survival in particular physical environments and for competence in a social group. But the physical environments of large urban societies are very different from those in which nomadic foraging societies existed for perhaps 2,000,000 years, and the social context of learning in modern technological societies is likewise different from the social environments that produced the human learning adaptation. In nomadic foraging societies there is no separation between what and how children learn and what they will become, but this division is quite common in modern societies.

When confronted with the tremendous gulf that separates life in a !Kung band from life in New York City, many doubt the utility of an evolutionary perspective as a framework for thinking about problems and opportunities in modern society. "All this about the hunter-gatherers is fine, but so what? Things are very different now." Certainly this is true. Human beings have changed the physical environment radically in much of the world and may have upset ecological balances tuned in the processes of evolution for

millions of years. We live in societies of hundreds of millions, maintain contact with every corner of the earth through technological systems, and preserve the information we generate in print, on tape, or on film. Indeed, the human species, evolved in the context of the social relations of a band in a direct connection with the physical environment,has proven to be extraordinarily "adaptable." We can survive in slums and ghettos, in suburban isolation, in huge organizations, separated from our families. And this ability to "adapt" to new or rapidly changing social and physical environments is sometimes offered as evidence that there are no significant biological constraints on human activity or organization. But our ability as a species to develop this astounding range of phenotypical adaptations has also led us into serious social and environmental problems and into great distress for a large number of people throughout the world.

This chapter is grounded in the notion that much of our distress and many of our problems are related to the difficulty (often the impossibility) of fulfilling biologically based human needs. The chapter is in four sections. The first is a general description of the profound changes that have taken place in the environment for the learning of the young since the development of sedentary societies approximately 10,000 years ago. Obviously a detailed historical account of these changes is beyond the scope of this study, but in the context of the socio-emotional systems

discussed in Chapters 2 and 3 some sense of the power and the extent of these changes may be derived.

The second section discusses three areas of "new" skill and knowledge that are required in a modern technological environment: encountering and dealing with rapid change, impossible amounts of information, and heightened competition. In this section some of the difficulties that can arise with the superimposition of these new attributes on older needs and expectations are noted.

In the third section of this chapter, one specific environment for children's learning, the school, will be examined in some detail. Certainly children learn in a multitude of environments in modern societies--in their homes, in peer groups, church groups, etc.--but it is the school that is charged by the society with the responsibility of <u>educating</u> children, and in many people's minds education and learning are synonomous. Whatever education is, or is supposed to be, children spend a great deal of their <u>time</u> in school, and for this reason alone the environment of the school has a great impact on their learning.

The final section of this chapter examines the ideas of representative authors in three areas crucial to children's education: (1) how learning is best done, (2) the role of adults in children's learning, and (3) the relationship between the educational institution and the larger society. Again, a thorough examination of educational thought in these areas in not possible in this study,

but in the context of the evolutionary perspective developed in previous chapters some insight into these important issues may be obtained.

A Much Changed Environment for Learning

Attenuation of the Connection with the Physical Environment

Nomadic foraging societies, and indeed all primate groups, are directly dependent upon the physical environment for food, shelter, and tools. The fluctuations of the physical environment are intertwined with not only the subsistence needs but also the social life of the group in these societies, and the size of the band and its patterns of fission and concentration are determined in consort with seasonal cycles, animal migrations, water availability, etc.

The development of agriculture, or more properly the development of widespread sedentary living, wrought great changes in human society--changes wich grew more rapid and complex with the development of more and more sophisticated technology and which we are only now beginning to understand. Living permanently in the same place allowed the accumulation of material wealth, and an assured food supply in association with large numbers contributed to specialization.

The development of large permanent societies upset the ancient social balances of the nomadic foraging way of life dramatically. One of the most serious implications of the attenuation of a people's direct connection with the natural environment is that what has been called in previous chapters the "absolute meaning" of one's activity becomes increasingly relative. When a !Kung woman goes out to gather food, when men go out to hunt, when children imitate their parents and other adults, there is no separation between the activity and group and individual survival and well being. But in modern technological societies the relationship between daily activity and the actual requirements of survival are often extraordinarily abstract. Certainly pushing a cart through a supermarket is "food getting," but the activity is devoid of the meaning implied by gathering or hunting. There are echos of this gap between what we do and the reasons we do it in the satisfaction we derive or do not derive from our work, and there are important implications of this gap for children's learning.

A related development of the attenuation of the connection with the natural environment has to do with the link between survival and well being in a social group. In nomadic foraging societies, the organization for subsistence and the organization for sociality are one and the same, and there is a direct relationship between the well being of the members of the group, the need for cooperation, and individual and group survival. As societies have grown larger and larger in human history and as humans have refined and extended

their abilities to produce food and affect the physical environment it has become possible to be assured of survival and have absolutely no assurance of well being. At least one of the results of this separation is alienation--from nature, from our own feelings, and from the means of subsistence. A good example of this is the meaningless job which provides money (which ensures survival) but which also undermines well being every day.

Attenuation of the Ties That Bind

Throughout most of human existence social groups consisted of a relatively small number of people who were related to one another either consanguineally or affinally. The individuals in these bands were connected to a number of people in other bands, and in all these societies everyone knew everyone else well and people interacted with one another in a wide variety of situations and on a daily basis. This context of closeness gave the people of these small societies a sense of security and belonging, and overlapping systems of reciprocity developed in every culture in every part of the world to reinforce these ties.

As human civilizations have become larger, balances that characterized early human societies have become drastically altered. A modern society like the U.S. is so large and diffused that it is impossible to know more than a few members of any group at a time, and most intimate relationships are highly individualized.

Although kinship still has some importance in modern societies, families are often scattered in different parts of the country--or even throughout the world. The nuclear family structure that was probably the fundamental unit of human society for as much as 2,000,000 years still exists, but in a highly abstracted and isolated form. Further, the nuclear family in any form is breaking down in many societies.*

Reciprocal arrangements still characterize human society, but they too have become abstracted and "linearized." Human reciprocity in modern technological societies is often mediated by money, legal systems, and/or organizational arrangements--all of which act to reduce the complex, multi-dimensional, emotional interactions associated with reciprocity in nomadic foraging societies to formal, quantified balances.

With the abstraction of family life and the general reduction of the number of opportunities for closeness, cooperation and belonging has come a generalization of social ties. The focus of human care, concern and loyalty has shifted, at least in part, from kin relations to political, institutional, or special interest entities. Hundreds of communities form in large societies, some of which have relationships to kindred (extended to include ethnicity, for example) or to nationalism (e.g. the American

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*For example, the 1980 U.S. Census shows a dramatic rise in the number of single parent families from 1970.

Legion), and some of which have little relation to either. There are Hispanic communities, gay communities, academic communities, religious communities, scientific communities and so on. But the commonality represented by a given designation of "community" may or may not be bound by place, may find its connection in a particular abstraction (e.g. a religion), or only, as in the case of the scientific community, through the processes of abstraction. A community may or may not have families at its core and may or may not be neighborly. It may be perceived from without and/or from within, and it is quite possible for an individual in the U.S. to belong to several, sometimes contradictory, communities at the same time. Who are The People now?

One other characteristic of modern life associated with the profound changes that have occurred in the ways people are bound together should be discussed here: the shift in the place and importance of children in modern society. As noted in the previous chapter, children are at the center of nomadic foraging societies--the "lodestones" of a kingroup--and they serve to bind members of the group more closely together. However, in modern societies children are often liabilities. Children (and, for that matter, the elderly, the handicapped) slow down a society bent on technological achievement, industrial production and successful competition, and the "child centered" societies of the human past have given way in most parts of the world to an "adult centered" society in which there is little room for children to participate.

This is not to say that parents are not attached to or focused upon their children in modern societies but only that many parents are torn between what they perceive is necessary for success in the modern world and what they perceive is necessary for their children. The schools in the United States reflect this gap and the attendant confusion. Schools have been characterized as "holding tanks" where children may be taken care of, taught information and skill, given every opportunity--and at the same time be kept out of the mainstream activities of the society.

The Triumph of Self-Interest

Membership in a group is no longer the automatic and obvious advantage it has always been in human life. As we have seen, in nomadic foraging societies the need of each individual in the group to have status and identity is balanced by the need to belong and to be secure. As long as the group remained small and in tune with the cycles and fluctuations of the physical environment this balance was remarkably stable because it enabled people to survive with relative ease and offered them opportunities to both belong to a social group and be individually important in that group. Self-interest is held in check on all fronts through conventions of sharing and gift-giving, through duties of kinship and marriage, through joking and ridicule of the arrogant and selfish, and through the very proximity of people to one another. But in modern tech-

nological societies self-interest is held in check only in particular areas. Many kinds of self-interest are, in fact, encouraged, rewarded, and unbridled.

The very size of modern societies and the profusion of allegiances that are necessary for well being in them make it possible for people to evade social responsibility rather easily. Cephu, the Mbuti hunter who sought to obtain a better catch for himself by putting his nets in advance of the other hunters,could not avoid the consequences of his transgression. The band was so small that once Cephu had been discovered the word passed rapidly. Soon all were involved. Life in a modern society is quite different. In part because real intimacy is often confined to individual relationships (e.g. marriages, friendships) rather than extended to whole groups of people, it is possible to remain relatively anonymous in many areas of social activity and thus pursue one's own ends with little interference from others. At the same time, since the criteria for acceptable behavior and skillful accomplishment in a modern society are so unclear, it is possible to feign both social and personal competence without getting found out. It "nothing is hidden in the igloo" of the Netsilik Eskimo, a great deal may be hidden in an inner-city apartment or a suburban home.

Finally, when wrongdoers are uncovered in a modern society they are usually referred to an "authority" so that the people who have suffered at the hands of the offending individual are

separated from that individual's chastisement. They too may evade responsibility in that they don't have to deal with the transgressor as an individual. It would never have occurred to the other members of Cephu's band to refer his case to a regional Mbuti court.

The Male-Female Imbalance

Many of the changes that have had a significant effect on the development of individual identity and sense of self have taken place in the area of male-female relations and the division of labor. In nomadic foraging societies the relationship between males and females is characterized by a system of balances and reciprocities that is formed by two rather different but overlapping dimensions of activity and experience. The sexual division of labor is a fundamental theme of social organization in every nomadic foraging society and is a central element of the environment of learning for children as they develop a sense of self and of how they fit in their world.

Though the sexual division of labor has persisted into modern times the balances that characterized it in nomadic foraging societies have altered profoundly. The status of women in all the world's large societies is substantially diminished from what it was in the pre-sedentary stage of human history. In fact, it is not entirely facetious to suggest that a "history of civilization" might be organized in terms of the accelerating erosion of the impor-

tance of the female dimension of experience in social structure and decision-making. This erosion is related to other changes noted above, of course--to increased distance from the natural environment, to large size and specialization, and to the reduction of the central place of children in the life of the society--but however it has come about it has resulted in an imbalance of status and influence of such proportions in modern societies that a growing number of people, both men and women, find it intolerable.

Not only has the balance itself been eroded but the entire framework through which males and females cooperated and through which each might obtain a somewhat different but equivalent status has broken down. Today there appears to be only one line of achievement that is recognized by the society at large, and women who find their negligible importance unacceptable are constrained to discover their identity in terms described by male experience in the course of rather recent human history. The impact of this breakdown of balance on the environment of learning for children cannot be over-emphasized (see below).

Cognitive Systems and Emotional Systems

One of the most remarkable changes that has occurred in the development of large societies and civilization is the ever-increasing emphasis on cognitive activities that take place outside the context of subsistence and social life. This is something

completely unique in human history, for in nomadic foraging societies there is no need to abstract cognitive processes from the normal processes of food-getting, socializing, healing, ceremony, etc. This separation of cognitive skill from other areas of human activity--and particularly from the emotional systems that underlie social interaction--has had a significant effect on how modern society views children's learning and consequently on how children are educated.

In a famous study among the Wolof in Senegal, Bruner gave Piagetian conservation tests to children who were (1) completely unschooled, (2) had attended village schools in rural areas, and (3) had gone to French schools in Dakar (1971). Bruner's findings indicate that the performance of these children on the Piagetian tasks varied according to the amount of exposure to Western culture they had had and, specifically, to the amount and kind of schooling in which they had engaged. Thus Wolof children who had been educated in French schools in Dakar performed about as well as the European children tested originally by Piaget, while the Wolof children who had attended the "bush schools" or had attended no school at all performed at progressively lower levels. Other findings by Price-Williams (1961) and DeLacey (1970, 1971) substantiate Bruner's claim that schooling and exposure have a significant effect on the development of the ability to perform more sophisticated cognitive operations in the Piagetian hierarchy.

This indicates that while the Piagetian concept of stages of

development may accurately describe what happens to all children in general terms, the kinds of operations that children perform (i.e. the ways in which their cognitive capacity is utilized) in a particular stage of development vary greatly between cultures (see Modgil, 1974). Bruner found an important difference between the unschooled Wolof children and the schooled Wolof children.

> In both the conservation and the concept experiments, the children were asked to give reasons for their answers. With both American and European children this type of question is usually put something like this: "Why do you say (or think) that thus and such is true?" Specifically, in a conservation problem, a child might be asked: "Why do you say that this glass has more water than this one?" But this type of a question would meet with uncomprehending silence when addressed to the unschooled children. If, however, the same question were changed in form to "Why is thus and such true?" it could often be answered quite easily. It would seem that the unschooled Wolof children lack Western self-consciousness: they do not distinguish between their own thought or statement about something and the thing itself (Bruner, 1971: 25-26).

The cultural bias of the Piagetian model of cognitive development has been examined rigorously in recent years, and many are beginning to believe that logico-mathematical reasoning in the formal operations stage* is neither the only nor the highest level of sophisticated cognitive operations of which humans are capable.

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*Said by Piaget to be the highest form of cognitive activity.

> ...a mode of thought may exist which does in fact not sharply distinguish intellect and emotion, logic and rhetoric and so forth. It does not follow from this theory that such thought processes are primitive, nor that the people who adopt this thinking cannot adopt strict logical criteria when the situation warrants... What seems to be at the bottom of the difficulty of understanding this type of thought is that "logic," "intellect," and "abstraction" are in fact terms which obey certain rules. We like to think that these rules fall along a continuum of development, both phylogenetic and ontogenetic. In addition, this path of development is regarded as unilineal, and any deviation from it perceived as inferior. Some people are now suspecting that parallel lines of development exist: that certain spheres of human activity require one kind of thinking, others demand other kinds of thinking, and each has its own set of rules... further suspicion arises that what has been hitherto demeaned as "primitive thinking" may indeed be quite sophisticated, and that the reason such thought has been labelled inferior is that we have no understanding of it (Price-Williams, 1975: 82).

From this perspective the measurements of intelligence devised by psychometricians of one culture will reflect the rules of cognitive activity current in that culture rather than the capacity of a given individual or population to learn those (or any other) rules.

Intelligence is a remarkably labile trait, virtually impossible to pin down with quantitative measurements. That the capacity to perform certain intellectual tasks is inherited is beyond doubt, but what amount of this undefinable capacity normal people have in relationship to one another or how the capacity is utilized in particular environments are questions with answers that are impossible to express quantitatively. Blurton

Jones and Konner describe the sophistication of the !Kung hunters in the formation and testing of hypotheses regarding animal behavior and suggest that "...evolution has produced in them an inquisitive turn of mind which leads them to explore problems and accumulate knowledge beyond what it is most immediately necessary for them to know (1976: 342).

After describing a zebra hunt they interpret the process they have witnessed.

> Such an intellective process is familiar to us from detective stories and indeed also from science itself. Evidently it is a basic feature of human mental life. it would be surprising indeed if repeated activation of hypotheses, trying them out against new data, integrating them with previously known facts, and rejecting ones which do not stand up, were habits of mind peculiar to western scientists and detectives. !Kung behavior indicates that, on the contrary, the very way of life for which the human brain evolved required them. That they are brought to impressive fruition by the technology of scientists and the leisure of novelists should not be allowed to persuade us that we invented them (Blurton Jones and Konner, 1976: 343).

But for all their analytical sophistication the !Kung, like the Wolof, would probably not understand a question that asked them to dissociate themselves from their environment, either physical or social. Although no Piagetian research has been done among the !Kung* it is likely that !Kung children would perform at a "lower" level on the Piagetian tests than European or American children. But if we

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*To the best of the author's knowledge.

were able to construct tests that measured a !Kung child's understanding of n/um and the !kia state we might be able to measure his or her "intelligence" more accurately.

It is likely that the basic cognitive equipment of the human being was developed in a context of daily problem-solving and pattern perception that included the proposing and testing of hypotheses. But these patterns and problems always occurred in a framework that consisted of socio-emotional systems associated with belonging to a group, being important as an individual in that group and acquiring skill and information directly associated with survival in the physical environment and successful group living. These systems have always been intertwined in human beings and are deeply rooted in our primate past.

The extraordinary flexibility of the human intellect is demonstrated by the increasing abstraction of cognitive activity from other human activities and the split that develops regularly between intellectual structures and socio-emotional needs in our time. To be sure, one may derive considerable pleasure from intellectual investigation alone (though it is the rare scholar who does not wish to see his or her work acknowledged in a social context), and considerable status in the society may be gained from intellectual inquiry that may seem to have little to do with the day-to-day life of the group. The split that has developed between human socio-emotional systems and human intellectual systems has made it possible for us to create astounding miracles of tech-

nology, of art, of thought.

So enamoured have we become of technological invention and conceptual creation that we have geared the formal education of our children to their intellectual abilities (as measured by the tests), have challenged them with abstraction outside a human social context and have innundated them with information.* In doing so we have ignored the fundamental connection between cognitive skill and socio-emotional needs. We have isolated the intellectual capacity from the context in which it evolved and in which it has had its most significant meaning throughout human existence. It is irresponsible to think that there are no consequences associated with this split. Indeed, it is reasonable to suggest that there are biological constraints on learning present in children of modern technological societies and that these constraints are grounded in socio-emotional need.

Skills and Attitudes for Change and Fragmentation

But if it is true that the learning of children is affected in some way by biologically based needs, it is also true that we neither can nor would wish to go back to the nomadic foraging way of life. It is obvious that dealing effectively with a modern

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*For a good example of the attitudes, intellectual and political, that underlie these foci in education see A Nation at Risk, the report of the National Commission on Excellence in Education (1983).

technological environment requires new skills and attitudes, and one of the major questions that comes out of an evolutionary perspective is whether or not children can learn these skills and attitudes in environments and through activities that also contribute to their socio-emotional well being. But in order to get at this question it is necessary to first look more closely at some of these new skills and attitudes and then (in the next section) examine the school environment in which these skills and attitudes are currently inculcated in children.

Change and Speed

The encounter with accelerating change is crucial to the identification of these new skills and attitudes, not only because so much has changed but because the expectation and the acceptance of change from generation to generation is a totally new dimension of human experience (e.g. Mead, 1970). And to the perception of and accomodation to change must be added the perception of and accomodation to speed, to the sheer velocity of not only change but of any activity--any movement between thoughts, circumstances, foci of attention.

Change is an integral part of technological culture, but at the same time we have come to understand this we have seen that change itself can undermine security and bring anxiety (for example, see the "Stress Scale" developed by T. Holmes of the University

of Washington). To add to the confusion, we have also accepted the fact (at least to a certain extent) that if children do not acquire attributes that are connected with understanding, tolerating and preparing for change, they will be able to obtain neither security nor status in the world. Thus it is not surprising to see a growing respect in U.S. society for attributes such as "flexibility" and "tolerance for ambiguity" even though these are often superimposed upon older social attributes such as "firmness of purpose" or "loyalty" with which they may at times appear to be at odds. "Going with the flow" is said to be different from being "weak and wishy-washy," though where the line of demarcation is is anybody's guess. Surely "rolling with the punches" in a modern society buys a little time to sort out the shifting characteristics of a particular situation or problem (or at least allows one to wait with less anxiety while they sort themselves out). Being flexible reserves one's energy, and enables one to avoid heavy emotional and/or physical investment in something that may prove to be ephemeral. It might be said, in fact, that attributes such as flexibility and tolerance for ambiguity are vital if an individual is to maintain any sense of continuity or meaning in a society changing as rapidly as ours is--even if the continuity is only personal.

Information Processing

Another new dimension of experience in a modern, industrial society is the existence of vast quantities of information, accumulated over more than 5,000 years and generated today at an ever-increasing rate. It is impossible for any individual to absorb, or even have access to, more than an infintessimal fraction of this whole, and surely part of the ambiguity we need to acquire a tolerance of originates in the insecurity of our irremediable ignorance. This ignorance is all the more disquieting because there is every reason to believe that much of this information-that-we-cannot-know is vital. It serves as the basis for decisions that affect our lives profoundly but are made by others.

In the age of the "information glut" it is important for people to not only learn to read, write, listen well and do math, but to develop organizing skills as well. It is not enough to analyze information; one must be able to systematize it too. In the absence of a common framework within which information may be interpreted -- such as existed in nomadic foraging societies -- we will be overwhelmed by the sheer quantity unless we know how to make connections, fit things together into categories, recognize patterns and relationships and prioritize them. All normally developed humans have the capacity to perform these cognitive activities, but as the amount of information that must be organized increases the intellectual processes involved become increasingly abstract, divorced from the experience

of individuals.

Is it not possible that like the rhesus macaques described by Lewis and Sackett (see Chapter 2) our "willingness to perform" may be greatly diminished in such an environment? As with flexibility and tolerance of ambiguity, the need for new information processing skills is co-existent with the anxiety that is produced by our inability to catch up and by the linearity of abstraction. Perhaps it is true that, increasingly, the "successful"* individuals in American life are people who can respond effectively and with minimal anxiety to change and who are able to organize information rapidly into useful categories, but it is also true that for others the anxiety is overwhelming. For those locked into specialized tasks that have become isolated from one another the sense of ignorance in all other areas but the specialty is frightening. In the face of ever-increasing specialization it is hard to genuinely belong anywhere, and it is often easier to simply "find a niche" than to develop broad organizing and synthesizing skills. It may be that it is in part this very response that makes it possible for a highly specialized and fragmented society to continue to function and to even further specialize and fragment. Unfortunately, this tendency is easily taken advantage of, and a new "skill" that lends itself most effectively to the maintenance of a highly specialized and compartmentalized society is <u>obedience</u>.

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*The criteria for the evaluation of success, especially in terms of children's education, will be explored in Chapter 5.

Members of foraging bands are never "obedient" in the sense that we use the term in our society. Adults do not recognize an unquestionable authority in leaders, nor do children recognize such authority in their parents. But people who are buried in inaccessible information and frozen in specialities may find obedience an important "survival technique," and, of course, obedience can assuage the anxiety of unknowing.

Heightened Competition and New Kinds of Self-Reliance

Competition is muted in nomadic foraging societies, as noted in the previous chapter, but it forms a behavioral and philosophical cornerstone of modern industrial society. In U. S. society competitiveness demands a certain willingness to take a chance, to risk losing, and a new form of self reliance. The "skills" of competition range from an ability to assess the possibilities for winning or losing in a given competitive situation, to dogged determination, to unconscious talent, to ruthless amorality. In our time working around the rules, on their edge, or even outside them are skills that, like flexibility, are receiving more and more attention and respect.

But even as flexibility may at times stand in contradiction to other important social attributes such as loyalty, the skills of successful competition are often in opposition to the need of even a highly fragmented society for cooperation. Indeed, self-reliance is an important characteristic of individuals in nomadic foraging

societies, but that self-reliance is, as we have seen, located in an all-pervasive social context. In our society self-reliance is simply laid over the need for reliance on others, and there is rarely an integration of the two. Although competition is encouraged in the schools, cooperation is encouraged too. Children are taught the value of team play even as they are urged to, first, measure their abilities against those of their teammates and, second, to beat the opposing team at all costs. The skills and attitudes of competition and the skills and attitudes of cooperation are often taught jumbled together indiscriminately, so that the predominant communication must be confusion and uncertainty.

Adaptation to change, the dynamics of overwhelming masses of information, and the demands of competition are not the only new areas of skill and knowledge that are required of the human species in technological societies, but there is no doubt that these skills and attitudes represent unfamiliar territory for us all. We are coerced by the inexhorability and obvious speed of change into the acceptance and expectation of it, though for most of our past we perceived and expected none. We are innundated with perpetually novel information that is critical to our well-being but is beyond our reach either because it is simply impossible for us to absorb it or because we don't have access to it. We are urged towards specialization at increasingly early stages of life so that today's high school students often "major" in subject areas before they have any concept of how one subject may relate to another.

The schools are in a critical position, for we have asked them to not only pass on the skills of reading, writing and computing and the history and certain values of the culture, but to keep up with every change as well. The same parents who insist that their children learn a generalized respect for adults in school insist on computer literacy -- or at least employability -- as a result of their children's schooling. The need for cooperation does not disappear in an environment which increasingly rewards self-interest and -reliance; the expectation of change does not supplant the expectation of continuity and security. The schools are expected to prepare children for life in the modern world and at the same time keep them true to "basic" values and principles of the culture -- even though there is less and less agreement as to what these values and principles are. This confusion of purposes for formal education and the sheer impossibility of the tasks assigned it become even more apparent in an examination of the schools themselves.

The Environment and Activities of Learning in the Schools

Attachment, Belonging, Cooperation

Children bring with them to all social situations a need to belong and to be close, but the very size of the school and of individual classes makes it difficult for children to fulfill this need. American schools have grown in size steadily throughout their

history for a variety of reasons (see below). It has been argued, for example, that large schools are more efficient, that they are cheaper, they they expose children to a larger cross-section of society, that the efficiency of size makes it possible to provide a larger number of children with sophisticated equipment. So persuasive have these arguments been in U. S. society that today in many parts of the country there are high schools serving more than 4,000 students. Certainly there is little opportunity for children to belong in a community that may consist of 4,000 individuals who meet in changing groups of 30-35 throughout the day. In a school of 4,000 it is simply impossible to know everyone, to interact with everyone in a way that will provide a sense of belonging and security — and this would be so even if other characteristics of the school environment didn't exacerbate a child's isolation and anonymity.

The emphasis on large size and economy in U. S. schools has had another significant effect on the learning environment. It has contributed to standardization and regularity in a kind of closed cycle: the move to economy (in this culture) implies larger size, which implies standardization, which allows further economy, which implies larger size. It may, indeed, be true that collecting as many as 4,000 students together can make it possible to expose all of them to sophisticated learning environments and materials such as well-equipped biology labs and computers, but it goes without saying that so many children cannot use these facilities all at once, nor can they use them in a manner they devise themselves. A schedule

is essential so that all will get a turn, and a formal curriculum must be drawn up so that all will have the same kind of experience with the equipment. This relationship between size and standardization is as evident on the level of the individual class as it is on the level of the school or the school system. Many of the rules imposed on the behavior of, say, elementary school children originate in the sheer impossibility of dealing with large numbers of small children effectively on an individual basis. As Schumacher has shown (1973) the fact of large size alone demands certain kinds of organizational structures in any social institution, and schools are no exception.

The isolation of children in the school environment in the context of an artificial social situation of impossible numbers is increased by the relative exclusion of the children's families from the life of the school. Of course parents are often involved in their children's education: they may be members of the PTA or the PAC, may serve on the School Committee, or take an interest in their children's homework. But in no significant way are parents part of the day-to-day social interactions of a public school. Sometimes siblings are in the same school, but characteristically they are in a different grade and are thus not part of the small "community within a community" that is formed by a child's class.

As chidren grow older and go to larger and larger schools their ability to participate as full members of the group that is formed by the classroom diminishes rapidly. To a certain extent elementary

school children may attain a sense of belonging and attachment to their class as a group. In a typical elementary school children usually have a single teacher and perhaps an aide for the entire year. They remain in a particular place for most of their school activities throughout the day -- their room -- which they often decorate with their own creations. Elementary schools are usually much smaller than junior high schools or high schools and are more likely to be set in neighborhoods so that young children are often in school with other children who are their friends outside of school. At the same time children in elementary schools are more likely to be encouraged to try everything rather than specialize.

Compared to the intense closeness and sense of attachment and security that have been described for nomadic foraging societies, the life of the elementary school represents rather weak social involvement, and, of course, the quality of social life and the amount of genuine participation afforded youngsters varies from school to school. But being in an elementary school is like being in a hunting and gathering band compared to what is to come.

At the age of 11 or 12 children in the public schools move from elementary schools to junior high schools. Suddenly a child on the verge of puberty or entering it is placed in unfamiliar territory, with a new selection of peers and new teachers with new, increasingly abstract expectations. One of the most confusing aspects of this change from an elementary school environment that provides at least some opportunity for closeness and contact to a junior high school

is the way in which the day is broken into small, usually hourly pieces that seem to have no relation to one another: English, American History, Spanish, Gym. Each of these environments is different from the others,* each remains somewhat unfamiliar throughout the year. These specialized, short-term learning environments provide few or no cues to help children get a sense of the relationship between the chunks of information being imparted to them in each environment -- much less help them see a relationship between what they're feeling as young humans becoming adults and what they're getting in class.

> In many ways, we break down children's convictions that things make sense, or their hope that things may prove to make sense. We do it, first of all, by breaking up life into arbitrary and disconnected hunks of subject matter, which we then try to "integrate" by such artificial and irrelevant devices as having children sing Swiss folk songs while they are studying the geography of Switzerland (Holt, 1964: 209).

The fragmentation of subject matter is only one effect of the specialization that breaks up closeness and community in the public schools. The identification by parents of teachers and school administrators as "experts in education" tends to intimidate many parents who might otherwise become more involved in their children's formal learning. Professional specialty gets in the way, and as the schools have taken on more and more of the socialization of young people in U. S. society a great breech has opened up between home and school

*Though in the sense that they are structured similarly they are alike.

In a similar way specialization often separates school administrators from teachers and some teachers from other teachers.*

In Chapter 3 it was noted that a variety of relationships and conventions serve to tie individuals in foraging bands together and ensure that cooperation will take place. Children in these societies grow in the context of meat-sharing partnerships, or gift-giving traditions, and they witness the results of broken reciprocal obligations. No such relations or traditions exist in the school except in the most attenuated and abstracted forms. For the most part the "exchange" relationships of a public school are one-sided and coercive: for obeying the teacher and fulfilling the requirements of each class children get good grades and/or teacher approval.

It is true that children are resourceful and resilient, and they form peer groups on their own that can and do provide some of the needed intimacy. But these groups are often like lifeboats in a great storm. They tend to be isolated from one another. Cliques form, gangs, clubs, and these groups often draw their identity more from a sense of who or what they are not than who they are. Then of course there are those who are left out, who have no group and live in perpetual anxiety.

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*The rift between shop teachers and academic teachers in vocational schools is a good example of this separation.

Place, Status, Identity

Children in nomadic foraging societies determine to a remarkable extent how they will spend their time, what they will do, whom they will be with; and the general impression of children in these societies is of confident little beings who have free run of the camp. Children in a gathering and hunting band have status through the very fact of their existence; adults pay attention to them, acceed to their wishes.

In a public school, on the other hand, the children have very little control over their time or the direction of their energy and attention. Activities are usually closely scheduled, whether in elementary school or secondary school, and children have virtually no say as to when certain activities are engaged in much less whether they will be engaged in or not. A child who is hungry must wait until lunch time, a child with high energy -- who would be running and playing with friends if he or she were outside -- must wait until recess, a child who has to go to the bathroom must have a pass. As has been pointed out many times in the literature critical of the public schools (e.g. Holt, 1964; Silberman, 1970 -- see below), all of the power in a school flows one way -- from the teachers and administrators downward to children. This is more like a gorilla dominance hierarchy (see Chapter 2) than a human social group.

One of the more complicated obstacles for children who are seeking identity and status to overcome is the manner in which schools

narrow the range of acceptable knowledge and skill and form them into hierarchies. All children have acquired a considerable repertoire of skill and an extensive library of knowledge before they ever set foot in a school, and long after they begin school children retain respect for a wide range of abilities in one another. The child who can jump rope well acquires a certain status within the peer group -- as does the child who can whistle, ride a bike or draw. But once children arrive at school they are rewarded primarily according to two main categories of skill: intellectual skills related to the acquisition and repetition of increasingly abstract information, and social skills that make it easier for the adults (e.g. getting along with others, keeping quiet, obeying). There is little opportunity for children to demonstrate or receive credit for other abilities they may have, and over time an official hierarchy of skill and knowledge, fostered by teachers and administrators (and often parents), is grudgingly accepted by children as they are confronted with it year after year.

For young children reading well, memorizing the multiplication tables and keeping quiet may not be particularly important skills. There are other things that may attract their attention more forcefully. But the hierarchical valuation of skill that forms a pillar of the institutional learning environment results in an inevitable constriction of status possibilities until by the time an adolescent reaches high school there are great gulfs of status between, for example, vocational skills and academic skills, and significant

and internalized differences between children who are in a "college preparation" course of study and those who are in a "general" course of study. Although there are exceptions,* it is possible to make the statement that in general the children with the most highly developed academic skills are the children with the most status -- as far as the school is concerned. If this is not a simple hierarchy, given the exceptions and the status that individuals may obtain through peer groups, it is an inexhorable one, and it leaves its mark on all children who go through formal schooling in the U. S.

In whatever way the status of an individual child in a school reflects the stratum of society from which he or she comes (see below), the situation is complicated and confused by the "culture of education" itself. Not only are the subject areas of formal education specialized but education itself is a specialty, and many of the values that are imposed upon the environment of the school are educational values -- that is, doing well on tests, reading well, writing well, doing math, etc. The discontinuities between the educational subculture and the culture at large may help to account for the fact that everyone is dissatisfied with what the schools are doing. In the world of the school making a fine piece of furniture does not count for as much as doing well on a history test, and if the criteria for the selection of children for particular educational "tracks" reflect many presumptions and biases of the general culture,

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* The most obvious exception is athletics through which a poor student can achieve considerable status in the school. However, even this status is usually qualified.

they also reflect the specific biases of the educational community.

One critical aspect of status, identity and importance for children in the schools has to do with the way in which they may be achieved. As noted above, there is a great deal of competition in school, and personal achievement is usually measured in terms of how one does in comparison with others. This is evident not only in a system of evaluation that involves hierarchical grades but in the emphasis of most schools in the U. S. on competitive team sports. The detrimental effects of grading on children's learning have been pointed out by many.

> One may wonder whether the present system of rewards and punishments as seen by pupils in school actually tends to inhibit the use of intuitive thinking. The assignment of grades in school typically emphasizes the acquisition of factual knowledge primarily because that is what is most easily evaluated; moreover, it tends to emphasize the correct answer, since it is the correct answer on the straightforward examination that can be graded as "correct" (Bruner, 1977: 66).

One of the most negative effects of grading is that it further constricts the ways in which a child may be acknowledged in the school. As noted above, children -- even through high school -- retain some of their own notion of status that encompasses a much wider range than that approved by the school. But in terms of how children are viewed by adults in the school environment the range of achievement is narrow indeed. Even though children have their own ideas about what is important and who has status, they are heavily influenced by

the framework for the evaluation of achievement imposed by the grading system of the schools.

At the same time, it is possible for children to obtain a rather different kind of status with adults by being cooperative, obedient, etc., regardless of their academic performance, and, as noted in the previous section, the double message of competition and cooperation easily leaves children confused about what they're supposed to do and how they fit with others.

Well being for humans includes a sense of personal status and place in a social context. If this is so we must acknowledge the fact that in institutions of formal education in the U. S. we are socializing children to learn to live without a complete sense of self. Children are being taught to find compensations (and sometimes find grotesque compensations) for, or to ignore, emotional systems that are deeply rooted in human biology. For some this compensation may indeed take the form of subordination to the directives of the adults in the school (and by extension to other authorities in the society). For others, "success" in school allows a certain status in the culture at large. Often this success results in a simple internalization of the values of the institution that made positive experiences possible (Bowles and Gintis, 1976). For others, the sense of powerlessness and anonymity that comes from having the need for status and personal identity thwarted results in violence, drug abuse, apathy and mental, if not physical dissociation from the life of the school.

> Now, if children are taught to adopt alienation as a way of life, it follows that they must have feelings of inadequacy, for nothing so saps self-confidence as alienation from the Self. It would follow that school, the chief agent in the process, must try to provide the children with "ego support," for culture tries to remedy the ills it creates.
>
> Hence the effort to give recognition... That anything essential was nurtured in this way is an open question, for the kind of individuality that was recognized as the children picked titles out of the [song book] index was mechanical, without a creative dimension, and under the strict control of the teacher. Let us conclude this discussion by saying that school metamorphoses the child, giving it the kind of Self the school can manage, and then proceeds to minister to the Self it has made (Henry, 1963: 291-292).

The Attention Structure in the Schools

Male-female roles and relations. As noted above, the relationship between men and women in modern technological society appears grotesquely unbalanced from an evolutionary perspective. This unbalance (and the anxiety it produces) is reflected in the schools and is in large part perpetuated there. Not surprisingly the gender roles presented to both boys and girls in the schools are often abstractions of the already abstracted roles that exist for men and women in the larger society.

> Teachers expect little boys to fight on the playground -- but not little girls. They expect little boys to use naughty words, although duty requires teachers to castigate them for it. But if a little girl uses naughty words teachers show deep trauma -- a state of agitation that can hardly be lost on either boys or girls. So,

> like parents, teachers foster the idea of protecting girls from sin; but tolerating it, even if not gracefully, among boys who, according to cultural mandate, will all have to go through stages of vulgarity in order to develop properly (Hunt, 1975: 409).

"Sexist" education, as this inculcation of different roles for boys and girls has been called, permeates all areas of the school environment: sports, dress codes, the curriculum. Boys are often required to take shop courses in junior high or high school, but are strongly discouraged from taking home economics. For girls, of course, it is exactly the opposite. The educational materials themselves reflect the general imbalance in the culture. Little girls go through school reading stories and hearing tales that tell them that it is likely that their achievements in life will not be as important as those of boys, and boys are taught, in the same way, that revealing their feelings to others is a mark of weakness.

The primary way in which these attitudes and identities are brought to children in the school is through the behavior and demonstrated attitudes of their teachers and administrators. Through elementary school most of a child's teachers are women, but most of the administrators are men. In the cafeteria children witness the work of the "lunchroom ladies" and occasionally they catch a glimpse of the male janitor in the halls.

In the gender roles children see adults playing in the school environment, in the attitudes of teachers and administrators, in the specialization of activities and courses for boys and girls and in

the subject matter itself, children are commanded to pay attention to particular patterns of activity through which a great deal of their gender identity, and thus their sense of self, will be acquired. The problem is not that these roles are different but that they are, for the most part, meaningless both in terms of whether functions defined by the roles may best be performed by males or females, and in terms of the reciprocal relations that different roles for males and females ensured for most of human existence.

Feminist research has helped to elucidate the kinds of imbalances that occur in the education of the young for gender roles in U. S. schools (e.g. Frazier and Sadker, 1973), and in recent years the issue of the roles boys and girls are compelled to observe and play in school has become prominent nationally (e.g. "The Pinks and the Blues," a PBS documentary, 1981). Many have urged the development of "non-sexist" education in which boys and girls are not educated from the perspective of difference but from the perspective of similarity. The best non-sexist education attempts to reestablish a balance and an equality between the experiences of men and women, boys and girls, but in attempting to make the experiences of boys and girls in school the same, non-sexist education may be confusing children in a different way (see below).

The adult context. In a modern industrial society all adults with whom a child comes in contact are, so to speak, lacking in depth. Adults are unidimensional -- or at best two dimensional-- figures

who fill particular, specialized roles and offer children foci for attention that are flat, unreal, and often uninteresting. The child rarely, if ever, sees adults responding to a variety of situations or playing a number of roles. There are retail clerks, teachers, ministers, nurses, etc. Even within the family the parents' work (that activity that commands such a great amount of their energy and attention) is mysterious to children.*

Nowhere in the experience of children in modern industrial society is this fragmentation and reduction of the meaning of adult life more obvious and intensified than it is in the schools -- and this situation has a negative effect on both the children and the adults involved. To begin with, there is no real connection between the world of the family and the world of the school, and the adult roles children do see their parents play usually have nothing whatever to do with the adult roles they see their teachers and other school personnel play. Unless parents make an exceptional effort to include school life in the life of the home there is virtually no relationship between the experiences a child has at home and the experiences he or she has at school.

The school environment prepares students primarily for the school environment and for a very abstracted concept of what adult

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*One depressing paradox of modern life is that children with mothers that remain at home have the opportunity to witness an adult functioning in a wide range of situations and environments, but mothers who choose to stay at home have increasingly less satisfaciton and less status from their choice.

life is about. Within the school the adults with whom children come in contact are almost without exception people who can serve as models for adult behavior in only the most specialized sense. From this perspective it is not remarkable that children who do well in school, and have the opportunity to do so, stay in school as long as they can.

This flatness and linearity of the adult focus of attention is mitigated to a certain extent in elementary school where children spend the entire school year with a single adult or a relatively small group of adults, but even here the adults are very specifically teachers, counselors, principals, secretaries. However, by the time children enter junior high school and have "Mrs. Smith for English" and "Mr. Jones for history" the constriction of the adult focus for children's attention is suffocating -- as is the corresponding boredom for Mrs. Smith and Mr. Jones. Unless a child conceives a desire to be an English teacher or a history teacher, the adults the child interacts with at school offer only the most narrow view of what the world is like, a dangerously false impression of what it takes to be an adult in the world and what the responsibilities and privileges of adulthood are.

Judgements of worth, of attractiveness, of meaning are made by children on the basis of what they <u>see</u> the adults around them doing, not on the basis of what the adults tell them their criteria should be. In nomadic foraging societies the adults are visible to the children in many roles and in many varied situations, and this panorama of moods, reactions and competencies offers children a model of

adulthood that is complex, interesting and variable. But the flat relationships between children and adults in the modern school guarantee confusion and boredom for both. Adults in the schools are able to perform only specific, highly regulated functions for most of their working day, and it is not surprising that after a time their interest flags. The communication of boredom and routinization to children that results is inevitable, even in the classes of the most dedicated teachers.

Children spend their first 16-18 years observing the fragmented activities of their parents, their teachers, and all the other adults around them. Then, suddenly, whether it's at 16 years of age for a high school dropout, 18 for a high school graduate, 21 for a college graduate, etc., children are expected to begin filling adult roles for which they have supposedly been preparing in school. The transition to adulthood in U. S. society is often traumatic (e.g. Henry, 1965; Hruska, 1970), for children soon discover as they search for jobs and wrestle with responsibility that they have been prepared for roles that either don't really exist in the society or which exist only in the artificial environment of institutions like the school.

The adult world as presented to children in the schools does not provide a consistent or integrated focus of attention for their development. Nor does it serve as a model of adult reality. Perhaps the critical importance of children's peer groups in modern industrial societies -- not only as environments for learning but as definers of appropriate behavior and arbiters of meaning as well -- is related

to this fragmentation of the adult world as seen by children.

Other children. Children in nomadic foraging societies form age-peer groups when there are enough individuals close enough in age in the same band, but because of the small size of foraging bands the formation of these groups is rare and, in any case, is never exclusive. As noted in the previous chapter, in gathering and hunting societies younger children learn a great deal from older children and older children learn about babies and younger children by observing them, by playing with them, by seeing them grow and change.

In the schools children are segregated by age to such an extent that often 13- and 14-year-olds encounter one another only before or after school, between classes, or at lunch. To be sure many children have some contact with other children of different ages within their own families, in their neighborhoods, etc., but for the time they are in school (a significant part of their day) they are separated from both older and younger children.

A world in which children are categorized according to age and grade is a highly artificial one, and the gradual perception of these segregations and hierarchies as "normal" by children makes it all the more difficult for them to learn normally. There is no question that much of the important learning small children do comes through watching and imitating older children. This is as true in neighborhoods today as it was in nomadic foraging societies 1,000,000 years ago. By the same token, all higher primates, including humans,

need a certain amount of practice in order to be competent parents. Surely the schools are contributing to modern confusion about child-rearing by fixing children from the age of five or younger in an environment in which they are always with age-mates. Older children don't get the opportunities to observe and interact with younger children and infants - experiences that will give them valuable information and practice for their own parenting.

Discipline: compelling attention. A great many writers who have not necessarily had an evolutionary perspective but have observed children carefully have described them as curious beings that are predisposed to investigate their environment actively.

> The child is curious. He wants to make sense out of things, find out how things work, gain competence and control over himself and his environment, do what he can see other people doing. He is open, receptive, and perceptive. He does not shut himself off from the strange, confused, complicated world around him. He observes it closely and sharply, tries to take it all in. He is experimental. He does not merely observe the world around him, but tastes it, touches it, hefts it, bends it, breaks it...(Holt, 1967: 169).

But children's curiosity, their responses to novelty and their motivation to explore are too intemperate for a school environment. Piaget has shown us that while there is a structure inherent in the way a child engages its world as it develops this structure has evolved in a manner that enables the child to discover the

the environment and his or her place in it. In nomadic foraging societies (and in other primate societies) the discoveries made by the young about the environment and their relationship to it take place within a framework that is intellectually and emotionally rich and diversified but is also inevitable in the context of the immediate and direct connection with the physical environment. Children in nomadic foraging societies are free to direct their attention wherever something is happening that engages it, and the "regulating mechanism" of this somewhat random attention is the framework imposed by the way of life. Because there is no separation between what these children learn and what they will become everything that engages their attention has meaning and contributes to their development as competent adults.

It does not take much imagination to see that the modern educational environment -- large in size, isolated from family life, specialized and segregated -- cannot tolerate anything like the full range of learning styles and activities that constitute the human evolutionary heritage. Children in school are trained over the years to direct their attention on command, to focus on math when it is time for math, on history when it is time for history, and so forth. Although the ability to concentrate and direct one's attention at will is an important information processing skill in a modern technological environment it does not follow that this skill is best developed through the external discipline of attention children receive in most schools. Indeed, many have noted the actual damage that may be

done to children by forcing their attention in this manner. If children are unable to explore their world and exercise their curiosity in a way that allows them to control their investment of time and energy they may very likely learn to simply stop exploring -- particularly if they are punished for not making their investigations at acceptable times and in acceptable ways (Henry, 1965: Holt, 1964). Such children may seek refuge in obedience, as noted above, or may simply seek to escape the constricted environment of the school as often as possible.

Activities of Learning in the Schools

The specific activities through which children acquire information and gain competence in a gathering and hunting society are appropriate to the knowledge and skill they need to be well-functioning adults in the society. Even the most formal modes of learning -- those associated with ritual and the supernatural -- occur in a world of total involvement and participation, and even when identifiable methods of instruction such as repetition are employed, there is no separation between the learner and the thing learned. If anything, the child's participation is intensified by the dramatic shift to more structured learning. All other knowledge and skill, whether pertaining to social interaction or subsistence, are acquired almost exclusively through observation, imitation, investigation and play. There is no formal training in hunting or gathering, tool-making,

story telling, dancing, manners, social conventions, or moral obligation, and children in these societies simply acquire their inhuma, their "intelligence," as they grow through adolescence and assume the responsibilities of adulthood.

In most public schools in the U. S. rote learning is the predominant mode of learning -- particularly in the higher grades. The emphasis is on the acquisition of information, and this information flows from teacher to student, or from book to student. It is then repeated by the student so that his or her acquisition of the information may be evaluated. If the way humans learn language is an apt metaphor for the way children in nomadic foraging societies learn most of what they need to know, the way children learn multiplication tables symbolizes much of the overall approach to learning in contemporary American public schools: memorization, repetition, precision. The fragmentation of children's social relationships in the schools has been noted above, and this situation is exacerbated by the activities of learning. Children are told to "be silent" in the classroom, to "do their own work" (see Chapter 5), even though they are constantly motivated internally to talk, to engage one another, to explore the classroom and their world outside.

> ITEM: The report card that a well-to-do suburban school system uses for kindergartners grades the five-year-olds on their "readiness for First Grade Work."
> Readiness involves some seventeen attributes, the first three of which read as follows:
>
> 1. Sits still and works at assigned task for 15 to 20 minutes.
> 2. Listens and follows directions.
> 3. Displays good work habits (Silberman, 1970: 130).

Most classrooms -- especially at the junior and senior high level -- are arranged with rows of chairs facing the teacher, and though observation and listening skills are usually encouraged, they are usually encouraged only in their passive form and within the framework set by the teacher, the curriculum or the schedule. More active investigation, experimentation or play (much less certain unflattering imitations) are rigorously discouraged in school. Ironically, most subjects in the schools are connected only by the modes in which they are presented to children and in the ways children must engage them. There is really little difference between the ways in which children learn about American history and the ways in which they learn about algebra. Typically there is little or no attempt in the public schools to match content and process, but on the contrary, an attempt is made to standardize the activities of learning as much as possible. This trend may be discerned in the ways in which educational technology (teaching machines, computerized instruction) has been applied in the schools in recent years (see Chapter 5).

Of course the gap that has been described above between the ways in which children learn effortlessly and the activities of learning in a modern public school does not imply that formal instruction is unnecessary for children growing up in a large industrial society. But the perception of this gap does raise certain questions -- among them the question asked at the beginning of the second section of this chapter: Must the schools be the way they are because the new skills are best taught in a highly abstracted, narrowly focused

environment?

The view of U. S. schools from the evolutionary perspective developed in this study is a bleak one indeed. According to this view, the schools are structured in ways that are often diametrically opposed to biological predispositions of children to participate in and belong to a group, and derive personal satisfaction from activities of learning such as play, exploration, and imitation. But is this unfortunate learning environment required ? Or have the schools simply become mirrors of the larger society in which considerations of size, economy and efficiency have come to dominate every aspect of social life? Do the schools represent a philosophical confusion about how and why children learn, or do they represent someone's well-developed social plan? In this final section three major themes of educational thought will be examined in an effort to get at these all-important questions. These themes will be analyzed in terms of the evolutionary perspective.

Educational Thought and an Evolutionary Perspective

Intellectual Development: How Do Children Learn Best?

Piaget's observations, as noted in Chapter 2, led him to the conclusion that a child, like any living organism, seeks interaction with its environment. According to Piaget children possess innate tendencies or "functional invariants" common to all animals:

(1) they act to organize their experience and (2) they adapt in an environment through processes Piaget termed "assimilation" and "accomodation." Assimilating is the incorporation of aspects of the environment into the child's own organizational system, while accomodating involves a modification of the child's organizational system in response to the environment. "Equilibration" is the effort to attain a balance between these two processes of adaptation. Cognitive development in children for Piaget is an interaction between the autoregulatory processes of the child (including physical maturation, the tendency to organize and the tendency to adapt) and the environment (including the social environment) in which the child lives.

The implication of this "interactionist" view of intellectual development for formal education is that:

> the development of intelligence, as is emerges from the recent research...is dependent upon natural, or spontaneous, processes, in the sense that they may be utilized and accelerated by education at home or in school but that they are not derived from that education and, on the contrary, constitute the preliminary and necessary condition of efficacity in any form of instruction (Piaget, 1971: 36).

The organic equilibration processes of the child require interaction with the environment, according to Piaget, and the activities of play, imitation, and investigation are integral elements of these processes (Piaget, 1952; 1962). Piaget also insists that social interaction, conversation, argument, etc., are extremely important

modes of learning, for among other things, they set up disequilibria which the child acts to reconcile. This reconciliation results in new learning and helps move the child from one stage of development to the next. Thus, according to Piaget, children need to work things through together as they encounter and learn to solve problems (Ginsburg and Opper, 1969).

Another important aspect of Piaget's work for education is that the child must be a full participant in the learning process. Since children in various stages of development are quite different from adults (Piaget, 1971) it follows that they must have a hand in what they learn and how they learn it. Adults simply cannot experience what a child experiences or think the way a child thinks. Piaget emphasizes that although children can be taught to make certain responses to particular stimuli, in the behaviorist tradition, there is no true understanding unless the child is at the stage at which such understanding is possible and he or she "invents" the principles that characterize each stage in his or her own way.

> A student who achieves a certain knowledge through free investigation and spontaneous effort will later be able to retain it; he will have acquired a methodology that can serve him for the rest of his life, which will stimulate his curiosity without the risk of exhausting it. At the very least, instead of having his memory take priority over his reasoning power, or subjugating his mind to exercises imposed from outside, he will learn to make his reason function by himself and will build his own ideas freely (Piaget, 1973: 93).

From Piaget's perspective the new skills of the modern world, including logico-mathematical reasoning, are best acquired in an environment that allows the child plenty of room to experiment and explore.

Though Jerome Bruner's focus is similarly upon the development of children's intellectual faculties and the methods by which this might be accomplished, he disagrees with Piaget concerning the inevitability of the relationship between the stages of cognitive development and a child's ability to understand. Bruner is interested in the effect that culture and the environment of learning can have on a child's comprehension.

> ...the immediate problem becomes one of converting the most powerful ways of knowing into a form that is within the grasp of a young learner... Such a view assumes that for any knowledge or empowering skill that exists in the culture there is a corresponding form that is within the grasp of a young learner at the stage of development where one finds him -- that any subject can be taught to anybody at any age in some form that is both interesting and honest (Bruner, 1971: 13).

Even with this disagreement between him and Piaget, Bruner arrives at similar conclusions about the activities of learning and the role of the child as learner. Bruner, like Piaget, rejects the mechanistic view of behaviorism and argues that understanding for a child must come as an "act of discovery" (1979). The child must have a certain control over his or her own learning process, must interact with the material to be learned, and manipulate it in his or her own way. In this manner, according to Bruner, children are able to establish a

system of intrinsic rewards in place of the extrinsic rewards that traditionally characterize children's education.

> The hypothesis I would propose here is that to the degree that one is able to approach learning as a task of discovering something rather than "learning about" it, to that degree there will be a tendency for the child to work with the autonomy of self-reward or, more properly, to be rewarded by discovery itself (Bruner, 1979: 88).

The evolutionary perspective developed by Piaget (see Chapter 2) focuses almost exclusively on intellectual development as the structure of behavior while emotional systems are seen as rather vague forces that energize cognitive development.

> All the authors agree that in all behavior the structure is cognitive, and the force, or the economy, is affective. Therefore, affect cannot be the cause of a cognitive structure, any more than intelligence can be the cause of affect, because a structure is not the cause of this energy, this force and vice versa. Between the two is a relation of correspondence, and not of causality (quoted in Modgil, 1974: 369).

But from the point of view of the evolutionary perspective presented in the previous chapters of this study any question of causality in the relationship between emotional systems and cognitive systems is beside the point. The young primate is motivated to seek contact with its environment and engage in the kinds of equilibrium-producing processes Piaget describes by emotional systems that mediate not only the direct activities of learning but the entire environment

in which learning takes place.

Although Piaget's work is of inestimable value for the understanding of children's cognitive development, his focus on the intellect -- and particularly his proposition that what is essentially Western, logico-mathematical reasoning is the highest stage of intellectual development -- has contributed to the perception of cognitive and socio-emotional systems as only peripherally related, and the sense that the cognitive is more significant than the emotional. For example, one logical extension of Piaget's thought lends a certain authority to the separation of children into age-groups during their educational experiences. If children in a particular stage are incapable of understanding certain concepts or performing certain kinds of operations, it can be argued that children in school should be grouped together in terms of the stages of development that they are in so that the world presented to them is neither incomprehensible nor boring. Now, surely if our only intent in the education of children is to develop their intellectual abilities as smoothly and efficiently as possible it makes sense to segregate them on the basis of age. However, if we take into consideration a wider range of human activity, including social interactions mediated by emotional needs, it may be seen that school environments structured to facilitate children's intellectual development only probably inhibit their development in other significant areas of life.

By the same token, the "intrinsic rewards" Bruner refers to must be associated with the emotional systems connected with the activities

of learning described in Chapter 2, but it is interesting to note that Bruner, like Piaget, does not devote much space to the relationship of cognitive systems to emotional systems. For Bruner a school should be an environment in which the activities of the intellect can become their own reward. Schools should provide

> more than a continuity with the broader community or with everyday experience. It is primarily the special community where one experiences discovery by the use of intelligence, where one leaps into new and unimagined realms of experience, experience that is discontinuous with what went before (Bruner, 1979: 118).

But for most of human history intellectual achievement, like other forms of achievement, took place in a social environment, and it is possible that the movement from extrinsic to intrinsic rewards Bruner has observed in the learning process involves other emotional systems too. If children are interested in the "growth and maintenance of mastery" (Bruner, 1979: 92) for the intrinsic rewards that accompany this acquisition, is it not probable that the perception and acknowledgement of this mastery by others -- adults and peers -- is a significant component of the reward? In this connection one might offer the same criticism of Bruner as of Piaget: If intellectual achievement is the only criterion of importance or status in the society of the school a good many children will probably never have the opportunity to experience the intrinsic rewards of intellectual investigation. They will be blocked by the very emphasis on mind work

in school if, for one reason or another, they are unable to become competent at a time and in a manner the school demands.

Dewey was aware of the problems associated with abstraction in education. In order to avoid the alienation implicit in the focus of the school on abstract operations and the acquisition of information that had no direct application to a child's out-of-school life, he proposed that the personal experience of each child serve as the starting place for the formal educational process. Like Piaget and Bruner, Dewey concentrated on the importance of the development of the individual and insisted that children must have an important role in what and how they learn. The methods of education that follow from these assumptions are

> first that the pupil have a genuine situation of experience--that there be a continuous activity in which he is interested for its own sake; secondly, that a genuine problem develop within this situation as a stimulus to thought; third, that he possess the information and make the observations needed to deal with it; fourth, that suggested solutions occur to him which he shall be responsible for developing in an orderly way; fifth, that he have opportunity and occasion to test his ideas by application, to make their meaning clear and to discover for himself their validity (Dewey, 1916: 192).

Once again, the emphasis is on discovery, on interaction with the environment. But Dewey also laid a great deal of emphasis on the continuity of the experience that such interaction generates and on the relationship of the experience to processes of thought. Dewey's focus was not only on intellectual development but on social

development as well -- the processes of education-as-socialization rather than the development of intellect alone.

> ...if an experience arouses curiosity, strengthens initiative, and sets up desire and purposes that are sufficiently intense to carry a person over dead places in the future, continuity works in a very different way. Every experience is a moving force. Its value can be judged only on the ground of what it moves toward and into (Dewey, 1938: 38).

For Dewey the purposes of formal education were more inclusive than they were for either Piaget or Bruner. Through the processes of education children should be able to realize their full individual potential, should be able to acquire the skills necessary to adapt successfully to a changing environment, and should become responsible citizens in a democracy.

Concentrating on the real-life experiences of individuals as the starting place in the formal educational process, Dewey assumed a powerful and generalized socializing effect for the schools which, in a sense, usurped areas of childrearing which had formerly been considered the responsibility of parents. But Dewey was interested in building a coherent society.* The education of the young was an opportunity to create a social order which would be democratic and participatory because it was founded upon the

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*After all, the title of Dewey's most influential work is Democracy and Education.

"freedom of intelligence, that is to say, freedom of observation and of judgment exercised in behalf of purposes that are intrinsically worthwhile" (1938: 61). According to Dewey if members of a society have this freedom and learn the skills of organizing and interpreting their experiences, a coherence and intelligibility will emerge in the society. There is thus, for Dewey, a clear relationship between individual achievement and social good.

> Where we now see only the outward doing and the outward product, there, behind all visible results, is the readjustment of mental attitude, the enlarged and sympathetic vision, the sense of growing power, and the willing ability to identify both insight and capacity with the interest of the world and man. Unless culture be a superficial polish, a veneering of mahogany over common wood, it surely is this -- the growth of the imagination in flexibility, in scope, and sympathy, till the life which the individual lives is informed with the life of nature and of society (Dewey, 1956: 61-62).

In Dewey's vision an individual child's sense of growing power and mastery could best take place in an "organization in which all individuals have an opportunity to contribute something," and he thus viewed the school as a society in which children should be full participants and in which all would have status because the criteria for achievement would be determined by the group itself in the context of the real-life experiences of group members.

It is ironic that Dewey never attempted to identify a relationship between children's learning and human evolution, for in his philosophical vision of the relationship between learning,

experience, and group living Dewey comes closer than any other educational thinker to describing those relationships as they most probably existed through most of human history.

The Adult Role in Children's Learning

Dewey insisted that the "greater maturity of the teacher" should "arrange conditions" for learning (1938: 47) and invisioned a reciprocal arrangement between teacher and student in which the student explores and the teacher experiments in an effort to find the best learning process for each individual student.

> The educator is responsible for a knowledge of individuals and for a knowledge of subject-matter that will enable activities to be selected which lend themselves to social organization, an organization in which all individuals have an opportunity to contribute something and in which the activities in which all participate are the chief carrier of [social] control (1938: 56).

A range of alternative models of education have arisen since Dewey's time, and many of these have gone several steps beyond the balance Dewey recommends between the guidance of the adult teacher and the necessity of the child to be a full participant in his or her own education. In such alternatives children

> learn independently, not in bunches. ...they learn our of interest and curiosity, not to please or appease the adults in power; and...they ought to be in control

> of their own learning, deciding for themselves what they want to learn and how they want to learn it (Holt, 1967: 169).

This general concept of children's learning led to the creation of the English alternative school, Summerhill, by A.S. Neill (1960). The controversy over the kind of education represented by Summerhill was already brewing in Dewey's time, and at least part of what Dewey was doing in Experience and Education (1938) was defending his ideas against critics and admonishing progressive educators not to lose sight of certain values.

> What is the place and meaning of subject-matter and of organization within experience? How does subject-matter function? Is there anything inherent in experience which tends towards progressive organization of its contents? What results follow when the materials of experience are not progressively organized? A philosophy which proceeds on the basis of rejection, of sheer opposition, will neglect these questions. It will tend to suppose that because the old education was based on ready-made organization, therefore it suffices to reject the principle of organization in toto, instead of striving to discover what it means and how it is to be attained on the basis of experience (1938: 20-21).

But Neill, Holt and others have an interest that is a bit different from Dewey's. They are interested in establishing an emotional reality for children that can compensate for the negative experiences they have (or may have) in the world at large.

> Over the years, many children have gone to Summerhill who were wholly defeated and demoralized by life, locked in their desperate protective strategies of self-defense and deliberate failure, filled with fear, suspiction, anger, and hatred... Most of the children there get well. They get back their strength, confidence, and courage, and turn to face life and to move out into it, as all healthy children really want to do... (Holt, 1970: 85)

Neill himself writes:

> Summerhill is possibly the happiest school in the world. We have no truants and seldom a case of homesickness. We very rarely have fights... I seldom hear a child cry, because children when free have much less hate to express than children who are downtrodden (Neill, 1960: 8).

The better-reasoned critiques of Summerhill and other alternative schools that are entirely child-directed emphasize the isolation of the alternative school environment from the realities of the rest of the world.*

> Perhaps Neill protects his community a few years too long, both from the oppressive mechanistic world and from adolescent solitude -- it is hard to be alone in Summerhill. Moreover, it seems to me that there is something inauthentic in Neill's latitudinarian lack of standards.

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*Once during the time I was director of the alternative school in Fitchburg, a teacher in the school was forced to resign when it was learned that he had smoked marajuana with a group of students while driving home from a GED testing session. The night this teacher resigned he told me that he had been raised "a Summerhill kid" and that his parents had provided little direction as he grew up. "You know," he said unhappily, "I never know what's appropriate because of that."

> For example, Beethoven and Rock 'n' Roll are considered equivalent (though Neill himself prefers Beethoven). We are not only free organisms but parts of a mankind that historically has made strides with great inspirations and through terrible conflicts. We cannot slough off that accumulation of cultures, however burdensome, without becoming trivial (Goodman, 1970: 215).

There is ample evidence that the educational environment need not be oppressive in order for children to acquire new and sophisticated skills such as reading, writing, computation and synthesis (e.g. Smith, et al, 1981), but what happens when there is no or little direction from adults?

We have seen that in both primate societies and nomadic foraging societies youngsters grow and learn in a framework of intimate relationships between subsistence and sociality. In nomadic foraging societies direction from the adults is in everything a child seems and does, for the framework itself is the guide for all. Children model their behavior on the behavior of adults who modeled their behavior on other adults when they were children. Children must have adult models, and the point is that they do have adult models whether the adults like it or accept the responsibility for serving as these models or not. In nomadic foraging societies there is relatively little burden for the socialization of children borne by the adults since they need merely go about their business and children will observe them, imitate them, play at being what they can only become. The problem with Summerhill is not so much that children are being socialized for environments

that don't really exist in the world outside the alternative school but that they are being socialized for no environment at all when the adults on whom they must model their behavior are engaged only in smoothing the way for children to determine their own own interests and involvements. Children need to witness adult commitment, tolerance, wisdom, and skill if these are the things we would teach them, for the young will not acquire such attributes in a social void.

School as Cultural Institution

While adult commitment, interest and involvement in nomadic foraging societies are, one might say, automatic and appropriate to the socialization tasks at hand, they are likely to be fragmented, arbitrary and contradictory in a modern industrial society. A good deal of educational thought has revolved around how the schools function, or might function, as cultural institutions, what ought to be taught in them in terms of providing coherent images of reality to children, and how they might act as agents of reform in the society.

It is interesting to view the work of educational conservatives like R.M. Hutchins in relation to the question of how the school is related to other elements of the society, for the attempt to prescribe a curriculum rooted in the culture's past is also an attempt to generate a coherent vision of life that may be pre-

sented to children by adults.

In The Higher Learning in America (1936) Hutchins described an idealized version of how the "best" elements of the past might inform the present and help stabilize the future. For Hutchins the institutions of formal learning in the U.S. should preserve, elucidate, and pass on the "highest" achievements and the "finest" artifacts of the culture. Understanding the past should provide the young with a framework for making decisions in the present and planning for the future. Thus, a general education program should be

> ...a course of study consisting of the greatest books of the western world and the arts of reading, writing, thinking, and speaking, together with mathematics, the best exemplar of the processes of human reason (p. 85).

These elements of Western culture are, for Hutchins, a legacy, a sacred trust which must be transmitted from master to student with the utmost integrity.

There is a wistful regret in The Higher Learning, a longing for former times. "Those happy days are gone forever," Hutchins laments in reference to the middle ages, when European universities were "havens" where students could seek the truth (p. 43), and it is enlightening to read the most recent edition (1961) of The Higher Learning, for in it the aging Hutchins includes a preface that acknowledges the profundity of the changes that had taken place in U.S. society between 1936 and 1961.

> This book was written twenty-five years ago, during the Great Depression, when Russia was a backward nation, when colonialism was in flower...
>
> This was before television, before World War II, before the United Nations, before the Cold War, before the Affluent Society, before the Hydrogen Bomb, before the forty-hour week, and before the rise and fall of the labor unions...(p. ix).

One of the clearly articulated assumptions of The Higher Learning is that any society must have a foundation that is common in all its members or it will become fragmented and trivial. That base, for Hutchins, was the classical Western tradition, and he believed that a comprehensive educational program which taught young people the skills of thought and expression in this context would provide the foundation for a "rational social order" (p. xix). Certainly the "back to basics" movement in public school systems across the country is in this same tradition, and it is not surprising that recently the National Commission on Excellence (1983) has recommended

> ...that State and local high school graduation requirements be strengthened and that, at a minimum, all students seeking a diploma be required to lay the foundations in the Five New Basics by taking the following curriculum during their 4 years of high school: (a) 4 years of English; (b) 3 years of mathematics: (c) 3 years of science; (d) 3 years of social studies; and (e) one-half year of computer science. For the college-bound, 2 years of foreign language in high school are strongly recommended in addition to those taken earlier (A Nation at Risk, 1983: p. 24).

In the last twenty years a number of thinkers have come to believe that a certain coherence and direction does indeed already exist in the public schools and that this direction and the activities and attitudes that emerge from it in the daily life of the

school reflect the educational institution's relationship to other institutions and traditions in the culture.

Raymond Callahan's classic study, Education and the Cult of Efficiency (1962) describes the development of standardization, large size, routinization, etc. in American education in terms of the nation's wholesale adoption of business methods and modes of evaluation in the first thirty years of this century. The ways in which teachers came to be paid, the ways in which school systems were funded, the ways in which books were chosen and materials purchased and children instructed all came to reflect an attempt to "hedge the bet" with children's education -- to obtain the most for the least.

> The tragedy itself was fourfold: that educational questions were subordinated to business considerations; that administrators were produced who were not, in any true sense, educators; that a scientific label was put on some very unscientific and dubious methods and practices; and that an anti-intellectual climate, already prevalent, was strengthened. As the business-industrial values and procedures spread into the thinking and acting of educators, countless educational decisions were made on economic or on non-educational grounds (Callahan, 1962: 246-247).

This tragedy persists in classrooms across the country in which learning is constrained by not only the size of classes, the materials available the expectations of administrators and parents, and the specialization and fragmentation of subject matter but, most of all, by the sense of formal education as a great fabri-

cation process through which children move in an orderly manner as automobiles move through an assembly line.

Callahan assumed that this was an unlucky historical trap that education in the United States had fallen into, but in the past ten or twelve years a growing number of investigations of formal education in the U.S. have appeared which insist that the incorporation of business methods and models into the formal education system in this country was no accident and that from one perspective at least the schools are working very well indeed. Because these authors urge a revision of old notions about what the purposes and achievements of formal education in the U.S. have been they have been called "Revisionists."

According to the Revisionists the schools are socializing children into specific, limited roles that are designed to perpetuate their powerlessness and insure their complicity in maintaining the status quo. The schools are "sorting machines" (Spring, 1976) that separate the elite of the society from those who are to do the society's menial tasks. But even the elite absorb through their schooling attitudes and behaviors which will contribute not at all to their individual fulfillment but which are essential to the smooth running of the capitalist enterprise (Bowles and Gintis, 1976).

White, Anglo-Saxon, rich and upper-middle class men formulated the fundamental philosophy and policy of American public education, and if there was not an active conspiracy there was at

least a tacit complicity. Katz (1975), for example, attempts to show that "what happened [in the development of American public education] represented more than a series of haphazard events emerging from countless decisions by local school boards, that patterns displayed in various places across the country looked remarkably alike and served quite similar purposes" (p. 149).

The Revisionists argue that the society itself -- dominated, controlled by a power elite -- can simply not tolerate the kind of intellectual development Piaget and Bruner advocate or the kind of school-community John Dewey dreamed of. As Bowles and Gintis put it in an article aptly entitled "If John Dewey Calls...Tell Him Things Didn't Work Out,"

> The way in which the school system helps to produce a stratified and alienated labor force for the capitalist enterprise is inconsistent with its serving to further individual self-development or equality of opportunity (1974: 8).

The Revisionist critique is not a simple call for reform in the schools. Indeed, many Revisionists have concluded that reform of public schooling is impossible. These critiques are, instead, indictments of the culture itself as it is revealed through an examination of one of its most important institutions, formal education. From the Revisionist perspective, Hutchins is guilty of, at best, well-meaning cultural imperialism, and Dewey is merely naive. If the culture itself is unacceptable nothing short of

massive social change will do.

> People must choose, and choose to fight for, socialism as a positive alternative based on a serious, desirable, and feasible vision. This vision must develop in the course of struggle, but the struggle will not develop without it (Bowles and Gintis, 1976: 286).

> Schools cannot at once both socialize to the values of an oppressor and toil for the liberation and the potency of the oppressed. If innovation is profound, it is subversive. If it is subversive, it is incompatible with the prime responsibilities of the public school (Kozol, 1965: 211).

But if the Revisionists are more radical than some other educational thinkers in their call for social revolution, it is interesting to note that most studies of formal education, no matter what the political perspective of the authors, share an assumption that the society the schools are part of must be improved or changed. And many of these studies identify institutions of formal education as potential agents of that change. This grand purpose for formal education suffuses the work of Dewey, as we have seen, and it is also present in Hutchins, who writes that "upon education our country must pin its hopes of true progress..." (1936: 119). But perhaps the most dramatic articulation of the idea that the educational institutions of the society can be important in social reform comes from Theodore Brameld who writes that public school instructors have an obligation to become "teacher citizens with convictions" who are not afraid to "exhibit these in the public

square" (1956: 338).

If most of the Revisionists take a dim view of the ability of formal institutions of education to lead a reform of society which would include a reform of themselves, they are nonetheless passionately committed to social change, to profound modifications in the way children are socialized and to critical evaluation of the attitudes and relations children acquire through the formal educational process.

An evolutionary perspective, too, inevitably calls for changes in contemporary society. The United States, and all other societies on earth, are torn by rifts, inequalities and contradictions that exist on a larger scale (and are thus perhaps more dangerous) than ever before in human history. This is a society in which many people live but not all belong, a society in which many people are not important. In our society the experiences of individuals are so diversified that communities can often be formed only around abstract commonalities (see Chapter 5),and some members have a considerable amount of control over other members. Above all, ours is a society in which children must wait in the wings until they are pushed out onto the stage of adult life with a jumble of lines from a hundred different plays and no idea of who they are supposed to be.

An evolutionary perspective enables one to see that all groups and individuals in the U.S. are caught in the same flood of change and unknowing, though all are not equally affected by it. Some

are luckier than others; some only appear to be lucky. The "advantages" themselves are relative and misleading, and they are often meaningful merely because others do not have them at the moment. Human beings, as a species, are adapted to social structures in which the deep attachments and emotional needs to belong are intertwined with (and balanced by) the equally deep needs of individuals for personal identity and status in the group. Male or female, young or old, need to belong and to be important simultaneously. When these needs are not fulfilled in the context of each other, humans suffer (and often make other humans suffer). Human learning evolved as a way of preparing for and becoming competent in this dynamic balance, and the activities of learning that characterize the species reflect this ancient purpose. Small wonder that in a society that is separated from the physical environment, which regularly separates individual importance and attachment to a group, and intellect and emotion, the social institutions of formal education also demonstrate these separations and perpetuate them in children.

An evolutionary perspective is indeed a perception of the need for social change, a reconstruction. But there are at least two characteristics of the framework for reform that are also an inevitable result of an evolutionary perspective.

Humans are not infinitely adaptable. One of the most troublesome misunderstandings of educational thought results from dual,

contradictory assumptions. On the one hand is the sense that there are specifically human ways of being, human capacities, human modes of learning; and on the other hand is the sense that humans are not constrained by this human-ness in any significant way. Hutchins, for example, contends that "one purpose of education is to draw out the elements of our common human nature. These elements are the same in any time or place" (1936: 66). Yet, as we have seen, he also exhorts us to create a "rationally ordered society" which is not necessarily founded on our shared understanding of these common elements. Bowles and Gintis urge "the development and articulation of the vision of a socialist alternative" (1976: 288) as an alternative which "people must choose, and choose to fight for" (1976: 286). At the same time they assert that

> ...the social and economic conditions of socialism will facilitate the full development of human capacities. These capacities are for cooperative, democratic, equal, and participatory human relationships; for cultural, emotional, and sensual fulfillment (1976: 266).

There is the sense here, and in a great many other educational works, that all we have to do is try harder to put our intellectual visions of a free and well-ordered society into operation and we will be able to get the job done. But these human capacities are not only capabilities in the sense that they are <u>possibilities</u> open to essentially unrestrained human beings. Because they developed in the course of human evolution they exert a certain

pressure on the behavior of human beings in any environment.

The confusion that exists in educational thought between assumptions about the human ability to adapt and the things that humans do "naturally" is apparently related to the gap that has developed in the course of sedentary living between intellect and socio-emotional systems. For many years our focus has been on the development of cognitive systems, and,as noted above, when one's measurements of achievement are confined to this particular area of human activity it appears that there is no end to what we humans can do. Indeed, perhaps in one sense there is no end (if the species survives). But if the "sample" for our evaluation is broadened to include social interactions and emotional needs our measurements break down; we see cognitive capacity and performance as but one area of human experience, and we see the biologically based pressures on human-as-social-being more clearly.

The necessity for intellectual reconstruction. Unless there is a nuclear war we will never become hunter-gatherers again, and although it is difficult to avoid, it is a mistake to romanticize the way of life that characterizes nomadic foraging societies. It is also a mistake to apply the insights derived from the study of these societies , the archaeological record, and primate societies too idealistically to modern technological societies. The environment for subsistence, for social life, and for the acquisition of individual identity today is vastly different from the environment

in which these needs were addressed in the human evolutionary past.

The great irony of the evolutionary perspective is that while biologically based adaptations acquired in our evolutionary past exert pressure on our behavior in the present -- regardless of the environment we find ourselves in -- our time of simply going along and doing what comes next as animals have done for hundreds of millions of years on earth is over. We have had too profound an effect on the physical environment; we have gathered ourselves into huge societies; we have developed the capacity to determine by our behavior which species will survive and which will not; and we also have the ability to extinguish ourselves and many other forms of life in a single moment. It is precisely <u>because</u> of the separations that have developed between the elements of human experience that we must reconstruct our world as a whole society.

But if it is true that we must reconstruct our connection with the physical environment and reconceive our social relationships in ways that are more whole, better balanced, longer ranged, it is likely that those social visions, interventions, and structures which seek to close the gap between belonging and importance; extend notions of what it valuable, praiseworthy, important; and enable the most people to be full participants will be more successful in establishing a framework that can promote balance and well being than those that do not. In other words, if we must recreate human society let us attempt to do so with as clear an understanding as we can obtain

of the biological needs that emerged from the social environments in which humans evolved. Otherwise we will be always working, in some capacity, against ourselves.

CHAPTER V

PUTTING AN EVOLUTIONARY PERSPECTIVE TO WORK

The term "evolutionary perspective" calls forth a variety of responses in people. Some are offended by the term, others are intrigued. Some feel that their religious beliefs are compromised by an evolutionary frame of reference (i.e. the "creationists") while others may see our primate past as a justification for the existence of hierarchy, aggression and violence in the contemporary world.

We owe much of the confusion about evolution and its relationship to modern human behavior to Herbert Spencer who applied Darwin's description of organic evolution to human history and social development. In his Principles of Psychology (1870-1872), Spencer invented the term "survival of the fittest" and maintained that the selection processes postulated by Darwin for animal species were also at work in human societies. That is, human beings, as products of the processes of evolution were constrained by their biological structures and, like other animals had to be part of the "struggle for existence." Spencer saw the struggles between different human societies as a reflection of this biological heritage and assumed that human history showed that some societies are more "fit" than others. This fitness, according to Spencer, could be observed in the relative power a given society has in the world community. Weak societies are less "fit" than strong

societies.

Spencer was wrong for a number of reasons that have been pointed out numerous times (e.g. Dobzhansky, 1955; Thomas, 1974; Gould, 1979). For although there are certainly relationships between biological evolution and cultural development, an understanding of these relationships requires far more than a simple superimposition of the concepts and language of organic evolution onto human history and social interaction.

(1) There is no necessary correlation between social success and reproductive success.* Being a powerful cultural figure does not guarantee a large number of offspring. Indeed, as noted in the previous chapter, having children can hinder one's social success in a modern technological society.

(2) The time frame of cultural development and change is so short that it can in no way be likened to the time frame of biological evolution. When we speak of "evolutionary processes" we are speaking of processes that take place over hundreds of thousands or millions of years. The incorporation of physiological and behavioral characteristics into the genetic structure of a species must not be confused with phenotypical responses to changing environments -- even if these responses are cultural themes, customs,

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*Of course at the most extreme end of the relationship there is a correlation: the victims of a genocidal purge by a dominant culture will surely reproduce less effectively than the members of the dominant culture.

conventions, modes of perception, etc. which exert tremendous pressure on human behavior.

(3) Finally, in the assumption that the survival of some must come at the expense of others, social darwinism ignores elements of balance and equilibrium that are also associated with biological evolution in general and, as we have seen, human evolution in particular.

In spite of the fact that social darwinism is a demonstrably false correlation it continues to exert a certain attraction. One often reads, for example, that those who do not "adapt" to the Information Age will be "left behind." The implication here is that there are those who are able to make "adaptations" to new environmental stresses induced by the Information Age and those who are not able to "adapt." A further implication is that those who cannot "adapt" are less "fit" than those who can. Although this is sheer nonsense in a biological sense and sidesteps important questions about opportunity, differing perceptions of what is valuable, etc. it is surprisingly common among people who may even know something about biological evolution.*

So manifestly dangerous is this simple-minded correllation of biological structure with social superiority that the term

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*I suspect that this unexamined social darwinism is most often found in conjunction with the completely contradictory, and likewise unexamined, assumption that evolution has stopped -- or in any case doesn't apply to humans any longer.

"evolutionary perspective" can set off a whole series of negative responses in those who have seen the abuses and can predict potential abuses of such a paradigm. The thought that contemporary human behavior and capacity may be "determined" by genetic structure or that destructive behavior is "natural" in the context of the human evolutionary past is unacceptable to people who see the need for profound change in human social interaction and organization. For these critics of social darwinism it is often easier to ignore the human evolutionary heritage altogether, for the notion that there are "biological constraints" on human beings rooted in an evolutionary past conjures up at least the potential for justifying attitudes and activities in human life that are oppressive, violent and dangerous.

The problem with this critique is that while legitimately condemning social darwinism it is likely to produce intellectual models for social change that ignore some of the very real human needs that are the product of human evolution. The irony, as noted in Chapter 4, is that it seems our most serious problems are the result of our losing touch with our evolutionary heritage through the development of increasingly sophisticated technological cultures. To demand a reform of the culture without acknowledging the origin and antiquity of the needs such reforms are supposed to address is like heading into the wilderness with neither woodcraft skill nor a map. It is likely that we will get lost.

The evolutionary perspective presented in this study is

surely in a preliminary stage. It is an attempt to identify the character of the pressure exerted by the human evolutionary heritage as much as it is an attempt to identify particular elements of that heritage. The previous chapters have presented evidence for the existence of at least three socio-emotional systems of behavioral motivation that are the result of our evolutionary past. Humans, like all other social primates, need to belong and be attached to a group. They also need to discover an individual identity in the context of the group they belong to. The way in which humans effect this delicate balance is through learning, and there are activities and environments for human learning that offer pleasure and satisfaction because they contribute to the realization of this ancient equilibrium.

But it must be emphasized that the evolutionary perspective presented here does not suggest that children's learning is determined by these genetically based emotional systems. Indeed, children are able to learn in a variety of environments and in the most unbalanced situations. The evolutionary heritage is subtle in human beings; it may be overridden by cultural demands, by environmental change. Children, like laboratory animals, may be taught to do any number of things if the reward-punishment system is carefully controlled. The point is that when children are forced to learn in environments that are foreign to the human species or through activities that are not integrated with social life a certain amount of distress is generated. In one sense the

evolutionary perspective presented here is as simple as the notion that when children feel good about their surroundings and themselves they learn better, but in another sense it is far more complex and demanding.

Evolutionary processes are made up of the interactions of the genotype, the phenotype, and the environment in which individual organisms and the deme exist. A successful adaptation represents an equilibrium in this process, a stable balance in which an organism exhibits characteristics that are well-suited to the environment in which it lives. The application of an evolutionary perspective to the development of social and educational policy suggests a search for this stability and balance as well. We are now what might be called the "motors of evolution" on the planet, and we must make the best choices possible, given our limited understanding. These choices should contribute to both survival and well being for the planet's inhabitants, to interactions with the other creatures of the earth that reflect our connection with them, to human social situations in which both attachment to groups and individual identity are possible.

At the same time an evolutionary perspective implies an expectation of complexity in the search for these balances, for evolution has produced the most intricate relationships between genotype, phenotype and environment, balances of whole dimensions of activity and experience as well as balances within single dimensions. These considerations of balance and complexity may be illustrated

by the following example.

As noted in Chapters 2, 3, and 4 the experiences of men and women in all nomadic foraging societies are different; their tasks are different, and the ways in which they participate in group life are different. There is evidence that these differences between men and women reach back in to a hominid and even earlier primate past and are therefore deeply canalized in our socio-emotional systems. From an evolutionary perspective difference in male-female relations is important, and gender identity is a crucial constituent of a child's sense of self.

If the perspective were to stop short here it could provide a justification for current sex roles in much the same way that Spencer's application of Darwin's ideas served to justify the status of the British Empire in his time. It could be said, for example, on the basis of this partial perspective, that since a woman's sphere of experience, in an evolutionary sense, revolves around the bearing and rearing of children, a woman's place, even in a modern technological society, is still in the home. But from an evolutionary perspective that seeks balance and expects complexity this is foolishness. While the differences between men and women are indeed important, they are only important because they have ensured cooperation, sharing, survival and equality. During most of human existence the differences between men and women made it possible for them to survive more effectively in a given environment, be full participants in a group and obtain individual status and impor-

tance at the same time. It is obvious today that the differences between the experience and tasks of men and women in the modern world perpetualte inequality rather than equality, and far from contributing to cooperation among people they tend to provoke confusion, isolation and rage.

For the educator attempting to apply an evolutionary perspective in the design of curriculum (for example) there is a complex dilemma here. If it is true that male-female differences are rooted as deeply in human biology as an evolutionary perspective indicates, then an educational program that attempts to make boys and girls equal by making them have the same experiences or making them interpret their experiences in the same way will likely cause distress for a child -- and perhaps be dangerous to his or her sense of self. On the other hand, it is manifestly harmful, also from an evolutionary perspective, to socialize boys and girls into different roles and self-perceptions that perpetuate imbalance and inequity.

It is possible that this dilemma is unresolvable and that in our time, when the differences between males and females no longer contribute to cooperation and equality, either the differences must give way to more linear conceptions of equality or the inequalities between men and women must persist. It is also possible that the differences between men and women will be understood in new ways that can again generate the dynamic equivalencies that characterized male-female relationships in the human evolutionary past. The work of

Gilligan (1982), Friedan (1981) and others may be an important step in this direction.

The answers aren't easy, and, in fact, because the evolutionary perspective emphasizes a need for an understanding of the relationship between the elements of the epigenetic system, the differences between biological evolution and cultural development, etc. it actually complicates the issue, whatever it is. This is rather distressing itself in a society that is already complex beyond any individual's grasp, but an evolutionary perspective can also help us ask the kinds of questions that might eventually provide simple answers -- answers that are farther-sighted, more inclusive and more equitable than those with which we have had to be content in the past.

Principles of Education from an Evolutionary Perspective

There is a great deal of work to be done before we will be able to describe the characteristics of learning common to our species in any detail, but it is possible at this time to describe some of the factors that should be taken into consideration in any decision that affects children's learning. These principles can provide some contact points for evaluation and planning in education that, unlike the positions taken at the North Middlesex School Committee hearings on Humanistic Education, are not mere matters of opinion.

Humanized criteria for evaluation in education. An evolutionary perspective on children's education implies an expansion of the criteria for the evaluation of educational programs and for the performance of children in these programs. For too many years education in the United States has been evaluated on the basis of quantitative measurements, and decisions about how education should be funded and structured have been made almost wholly on the basis of these measurements (e.g. Callahan, 1962). "Success" for a child in an educational program has been defined in many different ways but all these measurements of success have attempted to quantify achievement. Grades and test scores are only the most obvious forms of educational quantification. Success in education has been measured by income X years after high school graduation, by income in association with the total number of years and level of formal education. High schools are often judged successful or unsuccessful on the basis of the percentage of the graduating class that goes on to college, and public university departments are evaluated at least in part on the number of FTE's* the faculty are able to generate. Certainly other measurements of success have been attempted -- or at least invoked -- but the numbers game in education dominates the decision-making processes currently employed by legislators, school committess, school administrators,

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*Full Time Equivalent, a figure obtained by dividing the total number of credit hours for which students are registered in departmental offerings by the normal full-time student credit load (usually 15 credits).

teachers, parents, and, inevitably, the children themselves.

It is unlikely that these quantitative measurements will ever be wholly replaced by other criteria for evaluation, but we must balance our quantitative assessments of how schools are doing and what children are getting out of them with an understanding of the social impact of the school environment. If all that children took away from their school experience were the specialized skills and information they are "supposed" to learn, it would, perhaps, be possible to measure their success (and the success of the school) by testing. But for six or more hours, five days a week, the schools are providing children with examples of adult life, of group life, and with countless opportunities for interaction with other children. Thus it is important to add to our quantitative evaluations attempts to acquire an understanding of

a. the extent to which children have a sense of themselves as responsible members of a cooperating group as a result of their educational experiences.
b. the extent to which children are empowered to influence the decisions that are made concerning them by their educational experiences.
c. the extent to which children make an investment in the learning process itself; that is, the enthusiasm and willingness to learn that they demonstrate.

It goes without saying that an evaluation of the achievement of children using these additional criteria implies an evaluation of the schools or other learning environments children are in.

The criteria for evaluation of success in education presented

above are not new. But an evolutionary perspective can help us understand why they are so important in the assessment of formal (and non-formal) education and why so many people in different times and circumstances have recommended their adoption. If we locate the needs of children to belong, to be important and to learn in the biology of the human species they become critical to human well being, and this perception can exert some countervailing pressure on quantitative measurements that seem so inevitable when all that opposes them is someone's sense of balance, a teacher's opinion, or a child's feelings.

If we were to evaluate the public schools in the U.S. on the basis of the criteria suggested above we would find that they have failed miserably -- regardless of how the graduates of these institutions perform on SAT examinations or how much money they make X years after graduation. Indeed, others have also claimed that the schools are failing, but if we examine the introductory paragraph of A Nation at Risk (1983) it becomes obvious that this framework for evaluation is quite different from the one proposed here.

> Our Nation is at risk. Our once unchallenged preeminance in commerce, industry, science, and technological innovation is being overtaken by competitors throughout the world. This report is concerned with only one of the many causes and dimensions of the problem, but it is the one that undergirds American prosperity, security, and civility. We report to the American people that while we can take justifiable pride in what our schools and colleges have historically accomplished and contributed to

> to the United States and the well-being of its people, the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people. What was unimaginable a generation ago has begun to occur -- others are matching and surpassing our educational attainments.

An evolutionary perspective helps us see that the reason for either failure is not simply that we are not trying hard enough, or that our teachers need to be better trained, or that our educational methods and materials must be refined, but that there is something profoundly non-human about the way children are formally educated in our society and that the assumptions and interests reflected in reports such as A Nation at Risk are actually part of the problem.

Questions of size. A second principle that may be derived from an evolutionary perspective is that questions of size in the learning environment can never be reduced to questions of system efficiency, or the sophistication of the educational materials or the competence of the teachers. The larger the learning environment the more it must be managed; the pull toward structure, regularity, predictability, etc. is irresistible. In general it might be said that the larger the number of children who are part of a group in a class or a school, the less opportunity these children will have to satisfy their needs to belong and be important in that particular group. To be sure, children will form their own groups that

satisfy these needs more directly, but neither the junior high school English class nor the junior high school itself can serve as a meaningful community to most youngsters if it is large. It may be pointed out that many children have positive experiences in large schools. But it is important to note that even these experiences most often take place not in the context of the whole school or even the whole class, but in small sub-groups such as reading circles, sports teams, clubs, school plays, etc. A small group makes it possible for children to assume more self-management than a large group can allow and can at least create the opportunity for children to determine to a greater degree the quality and quantity of their participation in group activities. Small size does not make self-discipline inevitable, but because less management is required on the part of the teacher in a small group the possibility of children's discovering or inventing on their own is enhanced.

Another advantage of small learning groups is that within them greater diversity can be tolerated than in large, tightly managed groups. In Chapter 3 it was noted that in nomadic foraging bands all the members of the group were seen as unique individuals primarily because they are so well known. The size of the band makes this familiarity possible. The same might be said for a learning group of young children. In groups of, say, 10 or 15 it is almost impossible for children to see classmates of different races, religions or ethnic backgrounds as flat representatives of classes. Of course the larger the group the more easily

stereotypes may be applied, for in general the knowledge of individuals as individuals is proportionately less.

Size is not the only factor that affects the quality and effectiveness of the learning environment, but it is an important one. Children will be members of small groups in order to get what they need out of the social environment -- whether these groups are associated with official groups or not. If educators are to accept responsibility for the large-scale socialization that they are already engaged in, they would do well to think about how small communities may be integrated into the learning process. A small class will be able to answer a wider range of human needs for a greater diversity of children than will a large class. A small school will be more accessible as a community to which one may belong than a large school. There is no way to fudge this perception with more efficient structure, more sophisticated educational materials or better-trained teachers. When there are educational decisions to make the size of the learning group should be a critical factor in these decisions.

Power and participation of children. The reason that size is such an important variable in the evaluation and planning of educational environments is that it is characteristic of human learning for children to be full and powerful participants in a group as they learn. As noted in the previous chapter, many have observed the importance of children's self-motivated interaction with the en-

vironment and with other people around them to their development. Children learn best by doing, by initiating their own discovery processes, and this is so because full participation in group life allows them to fulfill both the need to belong and the need to have importance. Indeed, powerful participation in a group consists of having both these needs met simultaneously. Not only must children be able to draw a sense of security from the group they are part of, they should also have a sense of their own influence in that group as well. They should be part of a group that is partly theirs, and learning should be a process through which children become competent participants.

There is no inherent dichotomy between the ancient activities of learning (i.e. observing, imitating, playing, exploring) and the acquisition of new cognitive skills that are necessary for survival and well being in a modern technological environment. In fact, there is considerable evidence to show that when children are influential participants in their own learning they acquire logico-mathematical reasoning skills more thoroughly and in a more meaningful way than when these skills are inculcated in educational environments in which children must remain passive recipients (Piaget, 1973). There is no necessary gap between the processes of social development that satisfy biologically based needs and the processes of intellectual development that prepare children for life in the modern world, but in order to see this clearly it must first be recognized that the participatory nature of learning is

crucial.

An example or two of how this perspective might be used to question old assumptions about the environment of learning in the school might help clarify this important principle.

(1) A classroom should be quiet. No doubt there are certain intellectual activities -- reading, writing, computation -- which may at times be easier for individuals to perform in silence than in a noisy room. But if participation in the learning process is a critical part of a child's social and cognitive development then the choice to be in a quiet place at a particular time ought to be, at least in part, the child's own. A learning community, on the other other hand, probably should be full of conversation and activity, play and interaction. We have seen how much talk, banter, joking, etc. takes place constantly in nomadic foraging societies, and there is no reason to expect that a classroom full of children in a modern society would behave any differently if not suppressed.

(2) Children should do their own work. Why on earth should children do their own work if human learning is social and participatory in nature? The reasons for requiring children to do their own work must be either that the size of the educational environment prohibits effective participation or that when the only mode of evaluating children's activity in a learning situation is quantitative it is easy for them to cheat on tests, thus spoiling the efficacy of the evaluations. But what children learn when they learn toegether, share notions, challenge one another's perceptions and

work out problems as a group is not only the material presented to them but the ways in which that material is meaningful in their lives and, more generally, how to be competent participants in a group of humans.

From an evolutionary perspective there is absolutely no excuse for requiring children to do their own work unless they want to. If one vision of the use of computer technology in the learning process is of individual students working out computer-generated problems, each sitting at his or her own terminal, an alternative vision, from an evolutionary perspective, might be of groups of three or four children gathered about a terminal taking turns, playing, observing, experimenting, kibbitzing, laughing, goofing off, showing off, working out computer-generated problems as a group.

All skills are important. As noted in Chapter 4, one of the most serious obstacles to the full participation of children in their own learning has to do with the way in which different skills and areas of knowledge are valued in the schools. Certainly this valuation reflects biases of the culture at large and reinforces a class and caste structure that exists throughout U.S. society. But all children are negatively affected by the narrow framework for judging their inclinations and productions (and the inclinations and productions of others) presented to them by the schools. From the

beginning of formal schooling children with particular backgrounds, who speak other languages, who have different interests or abilities will automatically have less status than other children in school. But children who do have status in school are also unfortunate, for in the narrowly hierarchical framework of formal education they obtain an unrealistic view of their abilities and their worth which may be just as damaging, though not as painful, as the alienation and sense of incompetence felt by those who do not "measure up" to the school's expectations.

An evolutionary perspective emphasizes the importance of self-confidence and the sense of personal power. The status built by success in one area of endeavor builds a more generalized ability to engage in new activities successfully. The feeling of competence, associated with Bruner's "intrinsic motivation," is an essential element in the human learning process, and children who feel capable have the courage and confidence to try new things. Thus all skills that a child learns and masters are important components of his or her learning, and an effort must be made to incorporate this perception into our view of what education should be. Does this mean that the schools should be responsible for providing instruction and experience in everything? Surely this was the trend in the public schools until recently when it became obvious that the so-called "add-on" programs developed in the schools through the 1950's and early '60's were too cumbersome and expensive to be delivered by institutions of formal education. The school cannot

be responsible for providing dozens of "simulated learning environments" -- shops, greenhouses, etc. -- in addition to basic skills instruction, and the "back to basics" movement of the past few years reflects an awareness of this fact (among other things). But both the add-on movement and the back-to-basics movement missed a significant point about human skill and the relationship of skill to social importance and personal identity. Having a wide range of alternatives available for children to investigate is actually counterproductive if those alternatives are hierarchically ranked and becoming involved in certain activities automatically gives one more or less status than those involved in other activities. By the same token the back-to-basics focus only further constricts the range of achievement open to children in a school. We need to recognize the detrimental effects of a learning environment in which only certain skills and areas of knowledge are rewarded and in which other skills and areas of knowledge are ignored or punished.

One possibility might be to engage children in learning experiences that take place in the larger community rather than in the school (see below), another might be to emphasize the common elements of all kinds of competence in the learning children do in school.

Adult models. Children need (and will have, no matter what) adult models of behavior which they observe and imitate and which form the

core of their understanding of the world. So powerful is the child's need to derive meaning through the behavior of adults that he or she will follow adults into patterns of activity and attitude that make the fulfillment of other crucial needs impossible. As noted in the previous chapter, the usual structure of public education, especially in the later grades, provides children with pasteboard adults, presented to them as experts who demand obedience and respect but who rarely demonstrate the competence they supposedly possess in a manner children can use. Thus another principle of educational thought that may be derived from an evolutionary perspective is that children need to see a variety of adults in a variety of roles.

It is common for people who have been through the public school system in the U.S. to have had a "special teacher," a person who brought literature to life or made history accessible. Perhaps it was a shop teacher who was able to convey pride of skill in a job well done, or a basketball coach who helped athletes conceive of the whole sport in addition to teaching them technical skill. These adults often become models of behavior that deeply affect children's lives.* An evolutionary perspective suggests that at least two factors are at work in this powerful interaction between a child and the special teacher. First, this person usually demonstrates his or her interest in and concern for the child freely.

*For example, the author became an English major in college because of Mrs. Nelson, a high school English teacher whose commitment to literature was profound and obvious.

This is important, of course, in terms of the security and sense of belonging children need and also because such attention from an adult contributes to the child's sense of importance and personal value. Second, this special teacher is always someone who is deeply and personally engaged in the material being presented to the child. Special teachers are practitioners in their fields -- whether those fields are reading literature or carpentry. Acknowledgement of the importance of teachers who do what they teach underlies Bruner's belief

> that the school must also contain men and women who, in their own way, seek and embody excellence. This does not mean that we shall have to staff our schools with men and women of great genius but that the teacher must embody in his own approach to learning a pursuit of excellence (1979: 119).

The model of behavior children receive from the special teacher has meaning because it is something the adult chooses to do and believes is important. What makes Shakespeare irrelevant to children in public schools today is not only the archaic language and the unfamiliar dramatic situations and characters, but the fact that for many English teachers Shakespeare is also irrelevant. These teachers present Shakespeare to children because they must -- he is, after all, a significant part of our cultural lore -- but they are unable to describe, much less demonstrate, that importance because they do not actually feel it themselves. They cannot serve

as models for children in this regard and instead often communicate their own boredom with the material. The "model" for children becomes the adult's response to Shakespeare, not what the adult says about the bard, much less Shakespeare's plays themselves.

But even a school staffed wholly by special teachers would be an artificial place if the subjects they engaged in were arranged in a specialized, fragmented, and hierarchical manner. If the only subject areas available to children are academic areas, and if these subjects are offered as they are currently offered in junior and senior high schools in the U.S., the best special teachers in the world would be able to create at best a kind of "alternate reality" for children -- one with emotional depth and meaning, perhaps, but artificial nonetheless in the context of the world the children will have to live in when they get out of school. Children need to see a fuller range of adult activity than they are currently exposed to in the public schools -- whether these schools are vocationally or academically oriented. Children need to see a range of work, a diversity of attitudes towards the same kind of work, a variety of skill levels, and, as noted above, the school cannot provide simulations of all these work environments.

In addition to exposure to special teachers and to a range of activities in which adults are purposefully involved, children need to see individual adults in a variety of roles. In small communities children often know teachers in less formal capacities -- as fellow churchmembers, for example, or as neighbors -- and an

evolutionary perspective suggests that this kind of "extracurricular" interaction between the adult who is the teacher and the schoolchild contributes to the accuracy of the child's view of the adult world. If Ms. Jones the history teacher also acts in the community theatre group (in a small community) she exists for many children in at least two dimensions simultaneously. If Mr. Smith the librarian in the school has a drinking problem it may not be to his advantage that word gets around, but knowledge of his problem also contributes to the breadth of a child's version of adult reality. In larger communities these outside connections become less and less possible, and in large schools it is common for both teachers and children to exist for one another in very narrow dimensions indeed.

Other children and the elderly. The strict age-grade segregation that exists in most public schools today is also detrimental to a child's preparation for adult life. As noted in Chapters 3 and 4, younger children learn a great deal from older children, and older children learn from younger children what they need to know in order to become effective parents. Once again, it can never be the responsibility of the school to, say, supply infants for teenagers in highschool to observe and learn from, but the problem must be addressed in other ways.

In the same manner, children need to learn about age from the aged, for the perception of continuity in living, the knowledge that they will someday be old, affects choices that children make as

they prepare for adulthood (and thus the choices they make as adults). It is arguable that the "cult of youth," so obvious in Western society is related to the disenfranchisement of the elderly, the hiding away and ignoring of old folks.

Promising Directions

There have been significant developments in alternative and community education in the last 20 years that offer cause for cautious optimism concerning children's learning in the U.S. today when they are viewed in the context of an evolutionary perspective. Space does not allow a thorough investigation of these educational innovations in this study, but it is important to note that they exist and to comment briefly upon some of the characteristics through which they are related to an evolutionary perspective.

Alternative education. There is a popular belief, not only among people in our society in general but among educators as well, that the alternative school is dead, that the experiments in education that arose all across the country during the late 1960's and early 1970's are folding one by one, unable to generate the funding necessary to stay open and unable to build support in the community. While it is certain that the "back to basics" movement in education specifically and the general conservative swing of the nation in the late '70's and early '80's has directed criticism against

alternative education programs (and has spawned the recent report of the National Commission on Excellence in Education), it is also true that alternative schools and alternative educational philosophies have had a profound impact on not only the lives of a large number of children but on the educational establishment itself.

What makes alternative schools alternative is usually a commitment to providing opportunities for the participation of children in decision concerning their own learning. To be sure, there are all kinds of alternative schools. As noted in Chapter 4, there are a number of schools that provide virtually no direction for children from adults. These alternatives may offer a sense of belonging and importance to children and place them in an atmosphere in which learning is enjoyable, but they may also confuse children by not offering reasons to learn in the form of adult models of behavior. In addition there are schools organized around strict behavior modification programs that are also called alternative schools but in which a tremendous amount of structure and direction comes from the adults in the school.* Indeed, in some ways it is possible to conceive of military schools as "alternatives" to the public schools.

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*One should hasten to add, however, that in many of these behavior modification-oriented alternative schools the goal is the generation of self-discipline in the child and the development of his or her ability to enter into decision-making processes competently.

Nevertheless, there is a growing body of evidence that indicates that on average children who have been part of alternative educational programs (1) do at least as well academically (measured in traditional quantitative terms) as children in more traditional schools (see Smith et al, 1981) and (2) often come out of an alternative educational experience with broader-based, more generalizable skills and with a heightened sense of personal confidence and competence (e.g. Raywid, 1981). The fact that children attending alternative schools are often those who have not been able to succeed (measured in any way) in a traditional public school environment makes this evidence all the more compelling, for if an alternative school can generate enthusiasm for learning in children who have had negative school experiences there is something very valuable to be learned from the alternative process.

This is not the place for a detailed comparison of the elements of successful alternative education programs with the principles derived from an evolutionary perspective, though this is an important study which should be made in the near future. But one can't help noting that successful alternative school programs are often those in which students are engaged in many different kinds of activities, both "vocational" as well as "academic," so that the skills that are learned are varied and the opportunity for the acquisition of competence (and thus confidence) is greater that it usually is in public schools (e.g. the Channel 1 program in Gloucester, MA). At the same time there is evidence that an

alternative school in which children not only have some legitimate influence on the decisions that are made about their learning activities but are also provided with models of real adults who have definite skills, opinions, attitudes and personal experiences, is more successful at generating confidence and competence than a public school in which children have virtually no say in how they spend their day and are confronted with unidimensional adults whose opinions and attitudes are often hidden behind a curriculum (e.g. Holt, 1964; Henry, 1965). Finally, successful alternative schools are usually small.

Although it may be true that a number of alternative schools have closed down in recent years, it is also true that a far larger number of these schools have been incorporated into public school systems as alternatives.

> From [their] beginnings 10 years ago, public alternative schools have grown from 100 or so in 1970 to more than 10,000 today. Alternatives are found in 80% of the nation's larger school districts (those enrolling 25,000 or more students), and they have begun to appear even in the smallest districts: One out of every five districts enrolling fewer than 600 students now claims one or more alternatives. An estimated three million U.S. youngsters are currently enrolled in alternative programs (Raywid, 1981, 552).

This phenomenon can, of course, be seen from different points of view depending on one's frame of reference. From one perspective the incorporation of the alternative school or the principles

of alternative education by public schools represents a "co-opting" of the critique of public education that the alternative schools embodied. In this view these schools have been absorbed by the larger educational culture in much the same way other individuals and organizations critical of the cultural establishment have been absorbed. In the process of "mainstreaming," these alternative critiques have been weakened or deflected, and what is called an "alternative program" in a public school may in actuality be nothing more than a holding tank for the troublemakers of the public system.

That this occurs is undeniable; however, there is another view of the same situation that is more optimistic. The fact that many school systems across the country are adopting alternative programs and that teachers, administrators, parents and school board members are becoming aware that the schools need a wider range of options for children may be interpreted as a sign that the educational establishment itself is in flux. The incorporation of alternative programming in the public schools may represent a better understanding of the socialization responsibilities of the school and as such may serve as a handhold for future critique and experimentation.

But there is another problem associated with many alternative schools that is most important in the context of an evolutionary perspective. Just as a public school staffed entirely by special teachers would perforce be an artificial learning environment, so

an alternative school tucked away in the hills of Vermont is unable to satisy some of the critical principles of children's learning. Even if the alternative school is located in an urban setting it will have limited effectiveness as a learning environment if the children who attend it are isolated from the city they live in while they are in school. As noted above, the creation of a learning environment which socializes children for a world that can exist only in the alternative school can have serious consequences when children leave the school.

Community education. One way of increasing the variety of adult behavior models that can inform a child's learning, a way of offering children exposure to a greater variety of skill and a way of encouraging their participation as active learners and members of a group is to expand the concept of "education" to include a greater amount of the learning all people do in their communities. From a community education perspective any agency, any organization, any activity may serve as an educational resource, and anyone in the community may be a teacher.

The notion that learning is a community function has been part of American educational thought at least since Dewey's time, for, as noted in the previous chapter, he believed that learning was best done in a community in which personal experience forms the staring point of the learning experience. However, the variety of points of view connected with community education today and the

plethora of projects and programs with different goals and procedures that exist under the "community education" rubric testify to the complexities involved in defining the community and assessing what role it should play in children's learning.

Fantini, Loughran and Reed (1980) identify three major trends in community education that have gained impetus in recent years.

> The first of these trends is the shift from community education as "school-community relations" to "education-community relations." The movement now sees the school as one, but only one, of the educational agencies in the community...
>
> The second trend involves a shift in the purposes of community education. The major objective heretofore has been individual growth and development. Currently, increasing emphasis is being put on community development as co-equal in importance...
>
> The third trend involves conceptualizing community education more importantly as a process than as groups of programs or products (p. 11).

From an evolutionary perspective these trends can serve as cause for considerable optimism, for a re-integration of the human needs to be part of and participate in a community and to be important as individuals can only contribute to the well being of all those involved in the re-integration. By the same token, conceiving of community education as a process with general goals rather than specific, quantifiable outcomes or products is precisely what is demanded from an evolutionary perspective.

Firth and Reed (1982) offer a "Lifelong Learning Scale" for the assessment of all potential and current educational organizations

throughout the community. It will be seen that the left column of attributes describes formal educational institutions as they currently exist in U.S. society while the right column describes community education programs as defined by the trends identified by Fantini, Loughran and Reed.

THE LIFELONG LEARNING SCALE

EDUCATIONAL VARIABLES	DESCRIPTORS More Formal / More Structured / More Abstract / More Objective — Less Formal / More Flexible / More Concrete / More Subjective	N/A; COMMENTS
Objectives	1 2 3 4 5 Building and conservation of knowledge More cognitive More delayed Applying knowledge for personal and community development More psycholocal and physical More immediate	
Content And Sequence	1 2 3 4 5 Abstract; symbol systems Logically organized Scholarly disciplines Predictable sequence Requirements and prerequisites Concrete; experiential Psychologically organized Interdisciplinary Sequence less ordered Few requirements	
Time Units	1 2 3 4 5 Long term Full time Tightly scheduled Preset time periods Short term Part time Flexible schedule Situational time periods	
Learners	1 2 3 4 5 Age selective Selection criteria predictable and more precise Age inclusive Selection criteria less predictable and more general	

THE LIFELONG LEARNING SCALE (CONTINUED)

EDUCATIONAL VARIABLES	DESCRIPTORS More Formal / More Structured / More Abstract / More Objective — Less Formal / More Flexible / More Concrete / More Subjective	N/A; COMMENTS
Staff	1 2 3 4 5 Professionals — Lay oriented A major life aim — Ancillary life aim Highly trained — Short term training Distinct roles — Less distinct roles Credentials — Noncredentialed	
Teaching-Learning Approaches	1 2 3 4 5 Teacher more directive — Teacher more facilitating, advising, liking Teacher more responsible — Learner more responsible Learner is receiver — Learner more active	
Rewards and Evaluation	1 2 3 4 5 Extrinsic rewards — Intrinsic rewards More competitive — More cooperative Evaluation of knowing — Evaluation performance Product oriented — Process oriented Quantitative evaluation — Qualitative evaluation	
Curriculum Materials & Resources	1 2 3 4 5 Complex technology — Simpler technology Commercial production — Local production Written and spoken media — Multi-media	

THE LIFELONG LEARNING SCALE (CONTINUED)

EDUCATIONAL VARIABLES	DESCRIPTORS		N/A; COMMENTS
	More Formal More Structured More Abstract More Objective	Less Formal More Flexible More Concrete More Subjective	
Financial Resources	1 2 3 4 5 Larger expenditures per learner Long term investment Mostly government sponsored More elaborate accounting procedures Less flexible allocations	Smaller expenditures per learner Short term investment Varied sponsors Less elaborate accounting procedures More flexible allocations	
Building Resources	1 2 3 4 5 Major permanent constructions Specific, set spaces High maintenance cost Less often user constructed	Minor temporary constructions Flexible spaces Less maintenance cost More often user constructed	
Power, Control & Administration	1 2 3 4 5 Adherence to rules forms and routines More hierarchical Power partly function of status and resources Decision making by role Workers in established organizations Leaders viewed as managers	More personal More horizontal Power largely function of competency Decision making shared Workers less organized Leaders viewed as coordinators	

The correlation between the criteria generated for the evaluation of community education programs by Firth and Reed and the characteristics of human learning identified through an evolutionary perspective is striking indeed, and but a few examples need to be noted here. The objectives of an institution of formal education are "more cognitive" while the objectives of community education activities are "more psychological and physical." One might substitute for "psychological" the term "socio-emotional."

The content of a community education activity, according to the Lifelong Learning Scale is "experiential, psychologically organized and interdisciplinary," and the teacher in such an activity serves more as a facilitator, an advisor, someone who helps others link up and make connections. Learners in a community education activity are more responsible and active than they are in a formal school environment, and the rewards people obtain from being involved in community education activities are intrinsic (remember Bruner?) rather than extrinsic (in which the learning process is hooked to different emotional systems).

The trends in community education are encouraging and represent avenues through which an evolutionary perspective may be applied and evaluated. But the problems of community education programs are many, and in reviewing some of them we may also be able to obtain a clearer understanding of the ways in which the application of an evolutionary perspective is complicated in a modern technological society.

One of the most difficult tasks of community education is defining the community. As noted in Chapter 4, large societies in the world today are typically pluralistic confederations in which hundreds or even thousands of sub-communities may exist. Does the term "community education" imply an identification with a political entity -- a town or city? Certainly the political unit has a great capacity to wield power in large societies, to attract funding from larger political entities and to make large-scale decisions. But one has the sense from many community educators that "community education" implies a wide variety of groups that may or may not be permanent, that may have only a single issue in common, and may in fact find themselves pitted against the political unit. The failure to identify the community for which community education programs may be devised can land such programs in one of two traps. It is easy for community education programs to get caught in the impossible attempt to provide something for every need in every community. In this situation either the focus of the program becomes hopelessly diffused and the activities fragmented or the programs falls prey to the pull towards rigid structure and close management. By the same token, if it is perceived by the community at large that a particular program, project or activity is "for" a particular sub-community, chances are that other sub-groups will withhold their support.

An evolutionary perspective indicates that beneath the apparent dissimilarity of immediate needs and attitudes in any

society are deep socio-emotional needs that are common to all human beings. It suggests that when the structures and attitudes that emerge in a community project are formed in the context of these more general commonalities, a focus of activity can be generated which may elicit emotional investment from individuals in a number of disparate groups and provide the basis for community integration at a higher level (or, more properly, a re-integration at a deeper level). But establishing these broad structures and attitudes is an extremely difficult task.

The conflict between individual fulfillment and collective need that has characterized the community education movement since its inception reflects the fundamental separation between belonging to a group and being important as an individual noted in the previous chapter. From an evolutionary perspective these characteristics of human sociality should not be in conflict but in balance, yet the emphasis on individual aggrandizement in the modern world in general and in the U.S. in particular makes such a cooperation especially hard and may affect the success of community education projects in several ways.

(1) The idea of the group. Building a consciousness of community, particularly in the U.S., may be more difficult than anyone wants to admit and may imply a level of abstraction that most community educators would like to avoid. The ideas that unite members of a foraging band into The People no doubt exist at a certain degree of abstraction. But these ideas are inextricably

connected with the natural environment and with blood and marriage relationships. There is no separation between the idea and the actual people one sees on a day-to-day basis. In larger societies, and especially in pluralistic societies like the U.S. the idea of community consists of elements that are only vaguely related to the natural environment, if at all, and are only distantly related to kinship. Large societies have to characterize their "groupness" in terms that are increasingly abstract so that increasingly larger numbers of unrelated people in different environments can find some emotional basis of commonality in their often gratuitous association. The notions of The People represented by Christianity or The Irish are certainly emotionally charged, and they may serve to fulfill the fundamental needs of belonging and participation -- even of importance -- but they also require a kind of intellectual or metaphysical effort that unites people through imagination (see below).

(2) The importance of individuals. It is probably the investment of individuals, the participation of individuals from disparate communities who cross over lines to get what they need in the larger community that will enable an integrative community education program to be successful. In a society that places a primium on individual importance and fulfillment it is unrealistic to think that a community education project can begin to work positively any other way.

(3) The danger of individual importance. Because the tradition

of individuality is so powerful in modern life, a given community education project is often built around the abilities, talents, and concerns of a specific individual or small number of individuals who, in effect, own the idea. It is discouraging to think of the number of times good programs have broken down simply because the person or people in whom so much responsibility was located left, and those who remained had not had a full share in the vision. Charismatic leadership has its advantages and disadvantages in community development programs, but at the risk of oversimplifying it might be said that the most successful community education project, in the long run, will be the one that learns an important lesson from nomadic foraging societies. Leadership must be diffused and the widest possible participation and sharing of responsibility must be encouraged. In this way reliance on specific individuals may be reduced and the organization itself may become more like a community.

Education for synthesis. As noted at the end of Chapter 4, there is an ironic twist in an evolutionary perspective that has to do with the relationship between intellectual skill -- developed to a highly specialized degree in the course of civilization -- and socio-emotional needs which have often been ignored in the headlong rush to implement the productions of our unrestrained minds. This irony is present in the above discussion, for it was proposed there that a high level of abstraction is necessary in order to help provide

for people an emotional focus that can enable them to move away from abstraction and linearity into more emotionally sound, inclusive activities. At first this may seem an impossible contradiction, and it is necessary to investigate this "kink" in the evolutionary perspective in more detail.

Nomadic foraging societies and the societies of other primates are well-balanced and provide for the collective and individual needs of their members simultaneously because the way of life itself maintains the balance. There is nothing inherently "good" or "moral" about living life this way, but the intimate connection with a fluctuating physical environment makes cooperation essential, makes sharing advantageous, and encourages individuals to seek status and importance in the context of what is also best for the whole group. However, the physical world and our dependence on it have changed so dramatically in the past 8,000 - 10,000 years that the balances characteristic of nomadic foraging societies will not simply re-emerge if we construct educational and social activities that emphasize emotional needs. Getting people together is a commendable activity, but in a sense we have gone so far along the line of specialization and abstraction that often people don't realize what they're getting together for unless there is an idea that all can hold in common. Survival and well being in the modern world demand cognitive competence and a command of intellectual skills such as reading, writing, logoco-mathematical reasoning, and organization. While these skills need not be acquired in a

repressive learning environment they nevertheless require considerable practice and a certain amount of specialization. It may be that humans living in modern technological environments are victims of a kind of cognitive hypertrophy, but these over-developed intellectual mechanisms, though laid over older social mechanisms, are now critical to survival in the new environment.

If for centuries our intellectual systems have led us away from some of the most important characteristics of being human, these same intellectual systems must lead us back again. We cannot rely on our biological social inclinations though neither can we afford to ignore them. An evolutionary perspective suggests that human beings are "by nature" neither "bad" nor "good" but carry with them deeply rooted needs and inclinations that play out in different ways according to the environment in which they must be realized. In the environment in which these needs and inclinations developed they mediate a social balance between the group and the individual, between old and young, between male and female. But in other environments there is no telling what they might mediate.

In the absence of natural direction from the environment we must provide our own, and in order for many people in large societies to share these understandings they must be in the form of ideas. These ideas need not be new or original, and they may not be directly associated with specific needs of specific communities, but they must be large concepts, what Bruner calls "great organizing ideas, ideas that inevitably stem from deeper values and points of

view about man and nature" (1979: 120). They must be thoughts that can capture imagination and allow a considerable amount of room for individual interpretation and practical application within and among sub-groups in a society.

This is where the schools reenter the picture, and they must be included for a number of reasons. First, the schools by law already monopolize a considerable amount of a child's time. If the time is to be used more humanly, from an evolutionary perspective, the schools must be part of any changes that occur. Second, the schools are official, that is, they offer certificates of achievement that are useful in the world. Third, the schools already provide focal points for most communities in which there are children. Structures that are potentially integrative such as the PAC and the PTA are already in place in the overwhelming majority of school systems throughout the country. Finally, institutions of formal education are traditionally the repository of the kinds of selection, synthesizing and expressive skills that are critical to the empowerment of individuals and the cohesiveness of communities on any level in modern society.

Currently the schools expose children to ambiguity and uncertainty without helping them acquire the skills of connection-making, linking, and analyzing ideas and experiences. This condemns them to fear and mistrust. Any self-reliance that emerges from such a learning environment must be of necessity narrow and defensive, a self-reliance that eschews reciprocal obligation and

cooperation and contributes to isolation and self-centeredness. But perhaps the schools could serve as the coordinators, interpretors and facilitators of experience and skill rather than the repository for them.

This is an old idea which goes back, again, to Dewey and is implied in the design of the "Lifelong Learning Scale" mentioned above. All areas of endeavor, all experiences generate patterns, inter-relationships and methodologies for the solution of problems. When a carpenter estimates the cost and timing of a large job, when a cook plans a complex meal, when a scholar writes a book, there are a number of both cognitive and emotional processes at work. Regardless of the particular area in which they are being exercised these processes are much alike. They involve the perception and interpretation of pattern, the integration of several different kinds of information, the identification of problems and the making of decisions. Dewey believed that helping children understand these systems was the primary function of education in a democracy and insisted that as children learned about their own experiences and the experiences of others a bond of understanding would grow in the learning community. Developing a theoretical framework for their experiences would enable children to extend their skill, to enter into unfamiliar territory with less apprehension and to tolerate greater ambiguity and diversity as the world changed around them.

In addition to helping people in a community order and in-

terpret their experiences schools may pose the large questions. We need to know about the new elements of human interaction that have developed with large societies -- the acceptance and expectation of change, the burgeoning of information systems, the development of large-scale competition. Children growing up in a technological society need to know what power is and what forms it can take. They need to know where rules come from and why it is often easier to obey them than fight them. It is important for them to acquire an understanding of why they feel bad when they are not acknowledged by others and why success is hollow if it is not shared. And most of all, children need to get hold of unifying ideas, conceptions that link human beings to one another and to the other inhabitants of the earth.

In a community of learners that is attempting to understand the commonalities of human experience and the connections of human beings with other forms of life, tolerance, cooperation, and an appreciation for the experience of others may indeed develop. In such a community individuals may gain greater power to influence the decisions that are made concerning them by extending their skill and competence into new areas and by making connections between pieces of information that may have been forbidding and unknown in the past. At the same time such a learning community can help create individuals who are responsible members of a group, who factor into the utilization of any power and influence they might have an understanding of the ties that bind and the need for everyone

in the group to belong. Finally, people living and learning in such an environment will draw pleasure and satisfaction from the learning process itself because the process will be grounded in what is important to them: belonging to a group of human beings and being important in that group.

Perhaps it is idealistic to expect or demand the implementation of social and educational reforms that incorporate an evolutionary perspective on a large scale. There are so many special interests, so much threat and supposed threat in our society at present. But that is what is so appealing about this way of looking at things. It may inform our thought on any level, in any class, in any community education project, in any university. It may form the agenda of a study group or provide a counterpoint in a school committee meeting. An evolutionary perspective knits together a variety of ideas and events from a variety of times and places. It locates us and our children in the great panorama of life on earth and offers paradigms that can assist our attempts to understand our interactions and, from our understanding, create environments in which our interactions are more cooperative, productive and equitable. There is no going back, but an evolutionary perspective can help us go on.

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